

# 《研究生专业英语》

《Specialized English》

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# 第1章 概 论

## 第1节 绪论(Introduction)

### 一、英文科技写作的一般属性

#### 1. 科学论文写作的重要性

➤科学文的功能：信息记载与存储，信息交流，有助于科研创新。

➤科技论文写作的意义：发表论文是科学研究的目标之一；积累了已有的知识，避免了重复劳动，为创建新的思想提供了坚实基础；科学论文是科学进步的基础

#### 2. 英语科技论文的分类

➤科技应用文：内容一般不要求科技知识的创新，但有明确的特定功能，读者很广泛，既可能是科技工作者，也可能是外行或一般用户。

➤科学论文：内容以科学技术创新为特征，其读者是专业科学工作者或本行专家。

科技论文的内涵：➤理论分析：提出新的概念、原理、假设、定理、定律或法则，进行严格的推理分析或论证。对于应用科学还需要实验验证。➤实验研究(Experimental study)：发展新的实验方法与测试手段；新的实验结果的科学记录；合理、准确的数据处理；严密的分析论证。➤数值计算与计算机仿真(Simulation) ➤综述或述评(Review or survey)

#### 3. 科技论文应具备的特点：创新性、理论性与规范性

➤创新性(Creativity)：科技论文所介绍的研究成果应该是前所未有的，即有所发现、有所创造。创新程度有大、有小，能够达到“首先提出”、“首次发现”水平的研究成果不多。局部的改进、发展亦应属于创新。对于引进、消化吸收国外技术并再创新的工作也应重视，也是一种创新；衡量科研工作无价值的标准：创新性和创新程度。

➤理论性(Theorization)：从理论高度来分析和总结实验现象、实验结果，提出相应的机理，建立理论模型，并进一步提出有价值的科学问题。

➤规范性(Standardization)：遵守科学论文写作规范，保证论文的可读性和成果的可靠性。

#### 4. 科技论文写作的基本原则

内容真实、可靠，格式规范、统一，语言简洁、精确，内容不允许扩大或虚构。

➤直截了当：不能设置悬念、虚构情节。应使读者尽快地了解你的目的，更有利于明白你所讲的内容。

➤简洁并有逻辑性：要简洁地给出事物的本质，提炼出其内在精华。简洁的表达不仅是写作技巧，也是科学思维问题。

➤准确、实事求是

### 二、学习科技英语写作的意义

学习科技英语写作是从事科学研究工作，提高科研能力的必要环节。没有用文字记录下来的研究工作，实际上并没有留下任何成果。

科学论文对科研工作有指导意义

通过科技论文写作的训练，可以提高研究者的科学思维能力。

通过对数据、现象的分析、提炼，可以得到有意义的结论，从而指导科研工作。

论文水平的高低即取决于作者的学术水平，又受写作能力的影响。

### 三、科技英语学习中存在的问题

学得多，用得很少；应试教育存在的问题；教学方法；学习方法存在的问题。

### 四、关于学习方法的建议

➤注重基础知识的学习：遣词、造句、修辞、分段、标点符号使用。重视逻辑思维的正确表达，不要过多涉及文彩。➤系统学习与临摹相结合。➤针对容易出现的错误。➤学习英文科

技写作同时提高中文科技写作水平。

## 第2节 科技写作的基本要素

### 一、人称

➤传统观点：科学论文侧重叙事和推理，叙事要客观，推理要准确。读者重视的是论文的观点和内容，而不是作者本人，因此避免用第一，第二人称，认为 I say, I think 这样的表达是不科学的，应多用被动语态。

➤现代观点：文章要清晰、自然，不必回避第一，第二人称。

### 二、动词的时态和语态

➤动词的时态：所阐述的内容如果是客观事实或真理，通常用现在式。描述过去发生的事情，而且有必要表明时间顺序时，用过去式。过去发生而对现在仍有影响的事，用现在完成式。科学论文写作在不同的场合、不同的专业有不同的习惯。

➤动词的语态：使用何种语态要根据实际情况，以精炼、准确为原则。大多使用被动语态。例如：➤It will be seen from the table. ➤The table shows: ➤At the beginning of the distillation droplets of water could be observed to form. ➤Droplets of water appeared at the beginning of the distillation. ➤this application is used to report employee clocking that is gathered from the monitor system. ➤this application reports employee clocking that the monitor system record.

#### 有必要使用被动语态的情形

➤动作的主体不知道或不愿提起

a. Many houses are built in our neighborhood. 不必提到谁建造的这些房子。

b. Thousands were killed in the earthquake. 不必提动作的主体。

➤为了强调动作的接受者

c. Gravitation was discovered by Newton. 强调 gravitation。

d. The responsibility of keeping the record is given to him. 强调 responsibility of keeping record。

➤为了从这个句子过渡到下一个句子更连贯

e. We will develop a simplified line of production that will deliver the products automatically. These products are tested and monitored by on-line controller.

### 三、选词原则

➤应选用浅近易懂的词； ➤尽可能选用专有名词

➤尽可能用通常词，切忌用生僻的词； ➤尽量删除冗余的词或词组

有意的重复或者为了加重语气而增加的词与冗余的词不同，后者只能使句子加长，并不增加新的意思。

#### 1. 多余的副词、助动词或关系代名词的在中文和英文表达方式，或者说语感上有差别。

中文有些修饰词并没有明确的含义。例如“这种花很好看”。“很”字并不一定用来修饰“好”，只不过形成赞美的语感。因为说“这种花好看”就有一点近乎勉强的语感，类似于“这种花还可以”。因此译成英文可以说 This is a beautiful flower, 而不必说 very beautiful。

要注意文字表达和口语有差别。口语有时为了加强语气而使用一些副词，但文字表述中不应出现。过多的强调不仅变成没有强调，反而使人厌烦。

★The system exhibits very powerful data management capabilities. very powerful 的 very 显然是多余的。

★She reported that the project was absolutely complete. absolutely complete 的 absolutely 是多余的。很难说绝对完整。

★The file was completely erased and that file was partially erased. Completely 是冗余的，而



partially 是必要的。如果只说删除，就必然是全部删除。不是全部删除，当然要说明是部分删除。

★The program *may* execute properly if you employ these commands in the proper order.

★Researchers list the *resultant* effects of their investigations.

★The study was *absolutely* essential before the operation begun.

★These gritty materials, of course, contribute *very* significantly to the abrasive problem.

★Each of these phases was *indeed* completed

以下例句的从句后面显然有许多冗余。

★He is a man who never missed a meeting. (He never missed a meeting.)

★These units have the advantage that they can be maintained or replaced after the test series has been initiated.

## 2.冗长的惯用词组

Redundancies	Preferred usage	Redundancies	Preferred usage
a considerable amount of	much	give rise to	cause
a considerable number of	many	has been engaged in	has
at the present time	now	has the appearance of	appears
at majority of	most	in a position to	can, may
an adequate amount of	enough	in a very real sense	in a sense
an order of magnitude faster	10 times faster	in case	if
as a consequence of	because	in connection with	about, concern
as a matter of fact	in fact	in my opinion	I think
as a result of	because	in the absence of	without
as is the case	as happens	in the event that	if
at an early date	previously	in view of the fact	because, since
at no time	never	in as much as	for, as
at the conclusion of	after	it goes without saying	definitely
by means of	by, with	it is desirous of	wants
causal factor	cause	it has been reported by	reports
enclosed herewith	enclosed	it is apparent that	apparently
fewer in number	fewer	it is believed that	I think
first of all	first	it was observed	we observed
for the purpose of	for	join together	join
from the point of view	for	large in size	large
give an account of	describe	make reference to	refer to
it is clear that	clearly	melt down	melt
it is crucial that	must	mingle together	mingle
it is doubtful that	possibly	mix together	mix
it is generally believed	many think	mutual cooperation	cooperation
it is my understanding	I understand	more often than not	usually
it is often the case	often	new innovation	innovation
it is suggested that	I think	no later than	by
it is worth pointing out	note that	of great importance	useful
it may be that	I think	on account of	because
it seems to indicate	it indicates	on behalf of	for

it should be noted that	note that	on no occasion	never
period of time	period	on the basis of	by
postponed until later	postponed	on the ground that	since, because
prolong the duration	prolong	owing to the fact	since, because
qualified expert	expert	past experience	experience
quite a large quantity of	much	resultant effect	result
quite unique	unique	regardless of the fact that	even though
rather interesting	interesting	so as to	to
red in color	red	subject matter	subject
referred to as	called	subsequent to	after
we have insufficient knowledge	we do not know	suddenly collapse	collapse
we wish to thank	we thank	surprising upset	upset
with a view to	to	take into consideration	consider
with reference to	about	ten miles distant from	ten miles from
shuttle back and forth	shuttle	three hours of time	three hours
with regard to	concerning, about	true fact	fact
with the possible exception	except	unsolved problem	problem

### 练习

1. I have an idea in mind how can enhance our productivity.
2. His grade on the test is not high.
3. The cost of the on-line database search is reasonable.
4. We will need some new equipment soon.
5. Our action is based on the assumption that the competition will be taken by surprise.
6. You are directed by your supervisor to complete the assignment.
7. Our action is based on the belief that the national economy will be improved.
8. It was my duty to make a determination of the damages.
9. We will ask him of bringing about a change in this routine work.
10. This new equipment will result in a saving of maintenance.
11. Will you make an adjustment of this defect?
12. Implementation of the plan was effected by the crew.
13. Acceptance of all orders must be made by the chief.
14. All new personnel performed adaptation to the new conditions.
15. Researchers listed the resultant effects of their investigations.
16. The study was absolutely essential before the operation.
17. These gritty materials contribute very significantly to the abrasive problem.
18. For the most part, the samples obtained at the lower temperatures were quite grayish colored and somewhat abrasive.
19. Each of these phrases was indeed completed.
20. Ceramics have excellent heat retention and wear resistance.
21. The executives are found to be in agreement with the design.

### 3. 使用词义确切的动词

➤ 强动词：有具体的行动，如 weld, cut, break, inject 等。强动词往往可以给出明确的语义，使

词句直截了当、一目了然。

➤弱动词：本身并没有具体行动，如 verb to be, do, make, provide, include 等。弱动词可能带来含糊的语句，则需要读者去琢磨才能明白其中含义。

He has made several key sensor exploitation technological developments.

He has developed several key exploitation technologies.

前面用了 made 这个没有行为的弱动词，后面还少不了 development，不如用 develop 代替 made。

➤尽可能用强动词代替弱动词

➤尽可能地去掉空泛的连带词：弱动词往往与空泛的主语相连带。空泛的主词(如 it, there 等)，出现在句子的起始或中间，如果没有具体的先行名词，那么这些代名词并不代表什么实际东西。去掉空泛主词连带着它的弱动词，将使句子既简短又明了。

➤用强动词取代有名无实的词：有些词从动词转化成的名词，本来可以直截了当地用动词，却用转化成的名词，而且绕一个圈子，加上一个不起作用的冗长词。

举例：用强动词代替弱动词

★1a. The research findings are indicative of the fact that heavy air pollution may cause cancer.

1b. The research findings indicate that heavy air pollution may cause cancer.

indicate 取代 are indicative of the fact

★2a. The corporation held out to the end against the attacks of its competitors.

2b. The corporation persists efforts against its competitors.

persists efforts against 取代 held out to the end against the attacks of

★3a. The compiler is a program that takes the programmer's instructions and translates them into instructions the computer can understand.

3b. The compiler is a program, translating the programmer's instructions into that the computer can understand. 用短语代替从句，去掉弱动词 take。

举例：消除空泛的词语

1a. There will be one line for each column to be printed on the report.

1b. One line appears in each column of the report.

2a. The fact that there were impure chemicals caused the delay.

2b. Impure chemicals caused the delay.

3a. There were at least a hundred chemicals that were added to the list.

3b. A hundred chemicals were added to the list at least.

举例：动词和名词转换使用问题

appear	make an appearance	apply	make an application
assist	give assistance to	cancel	make a cancellation
commit	make a commitment	discuss	have a discussion
investigate	make an investigation	judge	make a judgment
liquidate	effect a liquidation	reconcile	make a reconciliation
record	make a recording		

举例：动词和名词转换使用问题

1a. The engineers and the programmers brought the project to a conclusion.

1b. The engineers and the programmers concluded the project.

2a. The judge took into consideration the facts of the case.

2b. The judge considered the facts of the case.

3a. The lab assistant carried out the experiments with the measurement while the instructor delivered the lecture.

- 3b. The lab assistant experimented with the measurement while the instructor lectured.  
 4a. The reduction of taxes was of major promise of the present administration.  
 4b. The present administration promised to reduce taxes.

举例：动词和名词转换使用问题

- 5a. The voltage regulator was put to severe test before being installed.  
 5b. The voltage regulator was tested severely before being installed.  
 6a. The new policy involved the standardization of the procedure.  
 6b. The new policy standardized the procedure.  
 7a. We must bring about a reconciliation of our differences.  
 7b. We must reconcile our differences.  
 8a. We have laid particular emphasis on this.  
 8b. We have emphasized this.

动词和名词转换使用问题练习

1. It was my duty to make a determination of the damage.
2. We will make him an accounting of his activities.
3. This new equipment will result in a saving in maintenance.
4. Will you please make an adjustment of the defect?
5. Implementation of the plan was effected by the crew.
6. The cost of the on – line database search was reasonable.
7. We will need some new equipment soon.
8. Our action is based on the assumption that the competition will be taken by surprise.
9. If there is not enough room to list all the desired fields on one line, put a comma after the last one of the first line, then continue on the next line by key – in an “F” and completing the list of desired field codes.
10. It was recognized that if a resonance should occur, large losses would be introduced in the range of resonance frequency and that from a practical viewpoint the transformer could not be used in such a region.

#### 4. 常用词的准确使用

➤用于说明论证的词

- ★”prove”, “demonstrate”是最明确肯定的用词。所陈述的事实，所要论证的理论确切无疑。
- ★”show”, “indicate”, “find”其明确肯定程度次于”prove”。常用于结果或结论的表达。
- ★”imply” 或 ”suggest”比上述动词的肯定程度更弱，用于申述隐含或推测性的见解。
- ★”can”, “will” 有一定程度的确定性。
- ★”likely”比 can 弱，比 probably 强
- ★”should”, “probably”有一定程度的可能性。较强的推测，隐含。
- ★”may”, “could”, “possibly”是最弱的推测，隐含。

➤表示 “可能性” 的词

用 would/probably would/could/might 都可以表示某种的可能性,但“可能”有程度上的区别。

★”would”=certain, 100 % 的可能

★”probably would”=very high, 80 % 的可能

★”could”=reasonably high, 50 % 的可能

★”might”=moderate, 30 % 的可能

➤关于“方法”

method/approach/procedure 通常中文 approach 也译为“方法”,但是有明显的差别。procedure 一般译为“步骤”,也有时也为“方法”,视上下文而定。

### 第3节 科技写作的造句

#### 一、强调写短句子

句子长度决定其可读性。长句子很难于理解。强调写短句是现代语言的发展趋势。科技工作者每天要接触的信息量太大,必须有效地利用时间。按照英文科技写作的统计,一句的长度以不超过 20 个字为宜。当然也不能只追求形式上的缩短与简化,忽视句子间的连接,变成不连贯的碎片。

##### 蹩脚的短句

The system features four menus.Each menu contains six options.There are no submenus.You can move between options with a single keystroke.Also,you can exit the system from all menus and screens.

系统以 4 个菜单为特色。每个菜单有 6 个选择项。没有子菜单。按一下键就可以在选项之间变换。你也可以从所有菜单或屏幕中退出系统。

#### 二、限制每个句子的内容

如果一个句子中包含的内容太多,就显得臃肿庞杂。这种情形特别多见于摘要、内容提要中。

病句: This memorandum is being distributed with the first-semester class cards,which will serve as a final check on the correctness of the registration of students and are to be used later as the midsemester grade cards,which are to be submitted prior to November 16.

修改: This memorandum is being distributed with the first-semester class cards,which will serve now as a final check on student registration.Later,they will be used later as the midsemester grades,which are due before November 16.

#### 三、简化句子结构

多用简单句,尽可能按照字句的自然顺序,即用 Subject + verb + object 的模式,少用倒装句及繁复的复合句,这都是科技写作中要求写短句所必须遵循的规律。

复合句对表达有联系的思想是很有用的,而且有利于增强句子的可读性。因此,简化复合句的结构也是简化句子结构的主要内容。

##### 举例

★1a. Before you may being using a system, you must “log on” to it. (使用系统之前,先注册)

1b. Log on to a system before using it.

★2a.In addition to its command progressing functions,another feature of the shell is its programming capabilities. (除处理命令的功能,外层另一特征是编程能力)

2b. The shell has command progressing and programming capabilities.

★3a. The clause to the effect that payment should be made after acceptance of the goods has been added to the contract. (合同中增加了货到后必须付款的条文)

3b. The clause for the requirement of making payment after acceping the goods has been added to the contract.

#### 四、明确句子的重点

不仅各个段落必须有明确的中心思想和重点内容。一个句子如果有几个成分或几项内容,也必须分清主次。

通过改变句子的结构，如果应该用插入语、修饰语。也可以加入表明主次关系的词。

举例：

病句：Mr. Lee is our teacher of Mathematics, and he is a Musician.

修改：Mr. Lee, our teacher of Mathematics, is a Musician. Mathematics 只是插入语，重点还是 Musician。

As a Musician, Mr. Lee is our teacher of Mathematics. Musician 是修饰，重点是 Mathematics。

Mr. Lee is a teacher of Mathematics and he is also a Musician. 也是 Musician, Mathematics 是重点。

病句：Our product is increased, and our equipment is wearing out. 突出设备损耗这一中心

修改：Our product is increased at the cost of wearing out equipment. 增加生产是以设备磨损为代价

Our product is increased, but our equipment is over worn out. 虽然产量增加了但设备是过度损耗

## 五、保持句子的首尾一贯性

如果一个句子包含几个成分，必须相互连贯，首尾一致，形成完整的意思。

对于包含几个意思的句子，也必须有一定的纽带连接在一起。相反地，本来是密切联系的意思，如果被割裂成独立的句子，也会造成不连贯的后果。

这种现象的产生有几种可能：一是没有分清主次；二是缺少必要的连接方式；三是不合逻辑的结构。

➤不能缺少必要的连接：两件事虽无主次关系，但有一定的联系才能放在同一句里，总得用一个连接词来反映这种关系。比如：因果，顺序等。

★The switch is turned on, and the motor starts.

Directly the switch is turned on, the motor starts.

★The temperature rises high enough, and the phase-change takes place in an alloy.

As the temperature rises high enough, the phase-change takes place in an alloy.

➤避免不合逻辑的结构：逻辑上没有联系的两件事，不能放在一起。

★Operation of the lathe is simple, but no machine will work well unless it is maintained.

Operation of the lathe is reliable, but no machine will work well unless it is maintained.  
车床有没有维护与操作简单并无联系，但与操作可靠直接有关。

★First we improve the quality, and then the price is increased.

First we improve the quality, and then we increase the price.

## 六、保持句子的平行结构

相近的观念必须用相同的表达形式。其目的是排列有序，前后呼应，语言流畅，便于理解。

任何对等的词、句，不论是什么语法结构，词类，都应保持平行。

采用列表形式的语句，列表的各项语法结构、词类都必须对等。

1a. This paragraph shows the documentation relationships about the place where things happen and the reason why things happen, and how things can be changed.

1b. This paragraph shows the documentation relationships: where things happen, why things happen, and how things can be changed.

2a. Multilevel training is necessary to meet the needs of managers, developers, and all the programming engineers.

2b. Multilevel training is necessary to meet the needs of managers, developers, and programmers.

## 七、避免修饰语与句子主体不连贯

修饰语应该与被修饰语的主题一致。

如果悬空修饰语与句子的主体没有明确的逻辑关系，将导致逻辑上的混乱，从而使语义含

糊。

通常可能出现的形式有：分词短语、动名词短语、不定式短语、介词短语、省略从句等。

#### 举 例

1a. Travelling at 160 km per hour, the sun can be reached in 100 years.

1b. Travelling at 160 km per hour, we can reach the sun in 100 years.

travelling 修饰的只能是 we。

2a. The screw rotor is measured, using a 3-dimensional measuring machine.

2b. We measured the screw rotor, using a 3-dimensional measuring machine.

用三坐标测量机的是人，而不是螺杆转子。

3a. To our surprise, he had failed.

3b. To our surprise, we heard the bad news.

不能用 to our surprise 来修饰 he。

4a. To get to the station, the bus stops right in front of our house.

4b. To get to the station, you may take the bus. It stops right in front of our house.

a 句中 To get to the station 是修饰 bus 的。应译为：公共汽车走到车站，它恰好停在我家门前。逻辑上不大通顺，因此应该为 b。

5a. After discussing with them, the contract was signed.

5b. After discussing with them, we signed the contract.

.After discussing with them 不能修饰 the contract。

6a. Like an engine, fuel is needed to work.

6b. Like an engine, one needs fuel to work.

Like an engine 不能修饰 fuel。

#### 八、慎用修饰语、代名词、插入语

可有可无的修饰语、插入语徒然使句子啰嗦、累赘，使语言不精确，能不用的就不用。

a. One can observe that athletics can be beneficial to the health of one who participates as well as entertaining for one who watches

b. Athletics can be healthful for players and entertaining for the fans.

a 句中下划线所指出的插入语形式，使简单的事复杂化。

#### 举 例

★a. The causal factors of her poverty become obvious when one considers the number of offspring she possesses.

b. Her poverty is increased because she has so many children.

★We keep our radio going often without paying any attention to it.

“often”对谁而言？这句话可作两种不同的理解：

We often keep our radio going. But we pay no attention to it.

We keep our radio going, but often pay no attention to it.

★The garden wedding was spoiled by rain. It lasted for a whole week.

代名词 it 何所指？应该为：

The garden wedding was spoiled by rain. The rain lasted for a whole week.

虽然重复用 rain，总比语意模糊为好。

#### 九、不用不完整的句子片段

不完整的句子片段在小说、散文中用来加强语气等等。不过在正式写作中，特别是科技写作中一般是不用的。

特别要注意的是在中文科技写作中有人习惯于不完整的片段句子。例如：研究了问题的特点，建立了数学模型，导出来结论…翻译成英文就会不伦不类。特别是在中文摘要中有一种流行的写法：全部用这种片段句子。不论这种习惯有如何广泛的市场，在正式科技文件或论文



中是不可取的；更不宜将这些片段句子直译成英文。

举例：★ Although I warned him time after time.

I warned him time after time. 或 Although I warned him time after time, he continued to smoke.

★ Singing along the way.

She went along singing

练习：病句修改

1. Gradually dozing off at my desk, the girl entered the room.
2. Introducing her to the office at last, we were told by Mr. Lee, our director, that she had moved to our city last week and that it was her first day at work.
3. Upon seeing her, my desire for sleep abruptly vanished.
4. Knowing none of the other people in the school, I thought she seemed rather lonely.
5. Waiting impatiently, at last the noon bell rang.
6. Hurrying over to her, I introduced myself and offered to help her become acquainted with the routine of the work.
7. Smiling graciously, my offer was accepted.
8. Delighted, a date was arranged for Saturday morning.
9. To reach her home, the bus stopped a block away.
10. After eating dinner, the TV entertained us for a while.

## 第 4 节 段落写作

文章的中心思想须要从多个侧面来论证，展开若干命题，从而应将文章分成相应的段落。分段在逻辑上是必要的。此外，分段还有一个重要的意义是作为视觉信号。类似于句子的标点符号，既作为逻辑信号，也是视觉信号。这对于提高文章的可读性，大有益处。因此，现在分段的形式也更为考究：如段落间的空行，分段小标题等。

一个段落总要对某个问题进行描述、定义、质疑、赞同或反对。如果是多个句子构成的段，则总要围绕一定的思想。因此，必须通过一个主题句(topic sentence)来概括这个思想。通过一些句子将这个思想充分展开，并将这些句子联系起来。

一篇文章可能由若干个段落组成。各段落之间应有逻辑上的连贯与内容的衔接。文章写作不能违背上述要求。否则，尽管每个句子语法上无误，但看起来很费力，不提供什么明确的思想。

文章主要是通过 topic sentence 陈述中心思想。

每一段必须有一个中心思想，通过 topic sentence 来表达。各个句子相互连贯地围绕这个思想展开。这是文章分段的基本要求。对任何文章都是相同的。

科技写作要求更注重简短，精练。科技英文写作平均每段不超过 175 个字。分段的句数并无限制，一段只有一句的形式也常有，而且这种短的段落往往强而有力。

**段落四要素：**主题句(topic sentence)、展开(fully development)、连贯(coherent)、段落间的衔接(transition)

### 一、主题句的提炼

主题句提出一个段落的命题，是全段内容的提纲，每一句话都以此为线索。它可以明确地将读者的注意集中。

主题句可以放在段落的**起始、末尾**，也可以放在**中间**。对一般写作，主题句安排的位置视行文趋势而定。对科技写作而言，最好是放在分段的第一句。因为科技写作提倡的是开门见山。对任何写作，这种风格也使读者有清新爽朗之感。

举例：主题句在开头

It was one of those extraordinarily bright days that make things look somewhat bigger. The avenue seemed to stretch wider and longer, and the buildings to leap higher into the sky. The

window-box blooms were not just a mass and a blur, it was as if they had been enlarged, so that you see the design of the blooms and even their petals. Indeed, you could sharply see all sorts of pleasant things that were usually too small for your notice. There should be more such days.

举例：主题句在结尾

The following summer we spent at Hamburg, then a fashionable but quite little watering place with gardens full of roses, where my mother had been sent for the cure. My father's health, to my young eyes at least, seemed neither to improve nor to grow worse; I became accustomed to his patient inactivity, and probably thought of him as old rather ill. He died in the early spring, suddenly stricken by paralysis; and I am still haunted by the look of his dear blue eyes, which had followed me so tenderly for nineteen years, and now tried to convey the good bye messages he could not speak. Twice in my life I have been at the deathbed of some one I dearly loved, who has vainly tried to say a last word to me; and I doubt if life holds a subtler anguish.

举例：主题句在开头，结尾加以总结

Without exception, every species naturally reproduces at so high a rate that, if not destroyed, the earth would soon be covered by the progeny of a single pair. Even slow-breeding man has doubled in 25 years, and at this rate, in less than 1000 years, there would literally not be standing room for his progeny. Linnaeus has calculated that if an annual plant produces only two seeds and no plant is so unproductive and their seedlings next year produced two, and so on, then in 20 years there should be 1,000,000 plants. The elephant is reckoned the slowest breeder of all animals, and I have taken some pains to estimate its minimum reproductive rate; it will be safest to assume that it begins breeding when 30 years old, and goes on breeding till 90 years, bringing forth six young in the interval, and surviving till 100 years old; if this be so, after 750 years there would be nearly 19,000,000 elephants alive, descended from the first pair.

## 二、充分展开主题思想

常用的方式：分析事实与数据细节；阐明因果关系；进行对比与分析。

过程说明是科技写作中最必要、最常用的一种方式。过程说明的关键在于如何对每一步都讲得清清楚楚。有几点值得注意的事项：

- ★尽可能细致、周到而又不啰嗦。
- ★如写实验过程，要保证别人可以按部就班地重复你的实验。这是对科学论文的基本要求。
- ★有些专用词或术语，或者将一些常用词赋予专门的含义，读者不一定熟悉时有必要作补充说明。
- ★不仅讲应该怎么做，也讲不能做什么。

过程说明中常用到比较和对照的方法

比较(comparison)是指出相似点，对照(contrast)是找出不同点：★表面上相似的事物指出它们的差异

★表面上不同的东西，说明它们共同的本质。★通过比较，由已知到未知。★通过比较说明某事物的优缺点。

## 三、段落中句子间的连贯性

➤逻辑连贯性：句子的内容与主题在逻辑上有自然的、内在的联系。时间顺序，因果关系，由主到次，由一般到特殊等。

★Most people like popular songs. (But) a few prefer Mozart and Bach.

★Slowly, he walked across the hall. (Then) he took out his key and opened the apartment.

➤前后呼应

★Last week it **snowed** for two whole days, It was the heaviest **snowfall** in the last six years.

★The best argument against vegetarianism is the Eskimos. They seem to thrive on a diet of nothing

but meat.

➤用词或短语过渡

★and 连接两件性质相同的事

I was out at the lake last week and I am going there again tomorrow.

★also, beside, in addition, furthermore 增加另一件事

The French are leaders in the world of fashion. They are also famous cooks.

Competitive games are good exercise. In addition, they teach the players teamwork.

➤用从句连接

★A college degree is expensive and does not always pay.

A college degree, which is expensive, does not always pay.

★Before I say “yes” or “no”, I would like to get more information.

★While I am on the subject, let me give you a few statistics.

■ first, next, meanwhile, finally, since then, later, afterwards, above, below, beyond, eventually, to the right, to the left 将事物按顺序排列

There was much unrest in the following years. Eventually, there was a series of violent incidents. We walked across the bridge. To the right was the post office; to the left, the City Bank.

■ but, still, however, yet, on the other hand, nevertheless, rather 连接两个事情的对比

I like painting. But I don't seem to understand modern art.

He is 85 years old. Yet, he is very healthy.

Most of our students learned English more than 10 years. Nevertheless, their English proficiency are much desired.

■ in fact, indeed 连接另一句以加强语气

Last week, I was ill. In fact, I had to stay in bed until Saturday.

The Windows 98 system is much different from Windows 95, Indeed, it is a quite new version.

■ in short, in brief, to sum up 总结、概括几件事

Scientists advice that we should eat food that has all the proteins, fats, carbohydrates, and vitamins we need. In short, they recommend a balanced diet.

■ for example, for instance 增加一个例子

The price of many commodities has decreased last year; the cost of sugar, for example, has lowered down 5%.

There are marked exceptions to this rule, for instance with the rabbit.

■ therefore, consequently 连接有因果顺序关系的事物

He was very tired, therefore he fell sound asleep.

■ of course, though, to be sure 给出限度或特例

Though he is learned, nevertheless he is not vain.

#### 四、段落间的过渡

段落间的过渡与分段内的句子连接有共同方式，但也有其特点。因为每个分段有自己的中

心思想，即每段有自己的论题，需要在前面交代的。交代各段论题时就为段落间过渡作了准备。

对于长篇论文，应预先交代各段的论题，段落间要有呼应。

练习：如何使句子更完美

1. Richard opened the door.He asked the stranger to come in.
- 2.The director walked into the room and we all become quite.
- 3.Lee is an excellent dancer. So is Liu.
- 4.Mr.Tian had an excellent radio voice,and he delivered many important speeches over the radio.
- 5.We reached the camp,and the storm clouds began to gather in the sky.
- 6.We drove to Shenyang by car.We returned by train.

## 第5节 英文科技论文写作过程

### 一、常见病

写英文技术文件的步骤是先写中文稿，然后逐字逐句翻成英文。

按照国家教育部学位委员会规定，理工科学位论文用中文撰写，但要将其中摘要与标题译成英文。因此，都是在全文已经定稿之后再翻译。此外，日常工作中还经常会有中译英的任务。所有的英文科技应用文写作基本上都是先有中文稿。但是这样往往容易出现一些弊病。

### 二、正确方法

- 不要逐字逐句地将中文译成英文
- 拟好提纲，独立地用英文撰写
- 用英语思维

先有英文提纲，再用英文遣词、造句，实际上是学习用英语来思维。

只要多阅读英文科技专业杂志，挑选本学科中写得比较地道韵英文文献，刻意临摹，多多实践，逐渐学会用英文习惯来表达专业内容，也就是用英语来思维。

### 三、如何克服英语思维和中文思维的差异

请用英文给我写信： Please use English give me write letter

Please write to me in English.

Write me in English,please.

- |                               |                                   |
|-------------------------------|-----------------------------------|
| 1a. He is my student.         | 1b. He is a student of mine.      |
| 2a.That is not your business. | 2b.That is not business of yours. |
| 3a. This is his book.         | 3b. This is a book of his.        |
- 反身所有格：所有格前面如果有数词 a, some, no 等应该加 own 构成反身所有格。
- |                        |                                  |
|------------------------|----------------------------------|
| 4a.He has no house.    | 4b. He has no house of his own.  |
| 5a. He has a position. | 5b.He has a position of his own. |

没有数词时，则不必在后面用 own 来构成反身所有格，own 作为形容词放在前面。如：

He has his own house. Everyone has his own haibit. Own 作为加强语气的形容词。

中文习惯于用生物做主语，而英文习惯用无生物做主语。

- |  |
|--|
| 6a. If you compare them carefully, you will find the difference. |
| 6b.Careful comparison of them will show you the difference.      |
| 7a.If you take this medicine,you will feel better.               |
| 7b.This medicine will make you feel better.                      |

英文习惯于用名词表示动作。

- |  |
|--|
| 8a. His friends did not know that he had gone.       |
| 8b.He had gone without the knowledge of his friends. |
| 9a. I do not know where he is.                       |
| 9b.I have nokonwledge of his where about.            |

10a. We are greatly disappointed to find that he is absent.

10b. We are greatly disappointed at his absence.

11a. I met him after he had left us long ago.

11b. I met him after a long separation.

#### 四、科学论文的动词时态

➤ 由于对前人工作的尊重，引述过去的文献，都用现在式。因为那是经过检验和验证的科学知识。

➤ 谈到自己的工作都用过去式。因为是过去做的事，有待于通过出版、检验与验证。

➤ 一般地说，摘要和正文中多用过去式。因为大多是谈论自己的工作。

➤ 一般地说，引言和结束语，现在式用得更多。因为那里谈得多的是已确立的知识。

#### 科技论文的基本结构

文章题目(Title)

作者(Authors)

工作单位(Affiliation)

摘要(Abstracts)

关键词(Key Words)

1. 引言(Introduction)

2. 实验方法(Experimental)

3. 实验结果(Results)

4. 分析讨论(Discussion)

5. 结论(Conclusions)

参考文献(Conference)

致谢(Acknowledgement)

附录(Appendix)

# 第2章 论文标题的创作

## 一、标题的功能与重要性

- 标题的功能是概括全文并便于检索。
- 一个新颖、有吸引力的标题，使人不禁联想到文章的新贡献。
- 一个空泛、平庸的标题很可能使有价值的内容也被忽视。
- 一般的读者首先是根据标题来考虑是否看摘要，而这个决定往往是在一目十行的过程中作出的。

## 二、标题的写作要求

- 应能反映文章的具体内容和特色：即使难以具体地反映文章的创新性，也应尽可能明确地表明研究工作的独到之处。
- 应简明、精辟：英文标题的长度一般为10~12个词，不超过100个印刷符号。常见的问题是标题写得过于简略，缺少必要的内容。既要写得简单，又要包含丰富的内容，必须精选每一个字，才能写得精辟。可见标题的确定很不容易，因此说它属于“创作”性的工作。
- 应符合标题的写作习惯

## 三、标题中常见的问题

### 1.最忌讳出现语法错误

Mechanism of Suppression of Nontransmissible Pneumonia in Mice Induced by Newcastle Disease Virus. (原标题应译为：Newcastle 病毒引起的小鼠中非传染性肺炎的抑制机理，正确的理解应为：在老鼠中 Newcastle 病毒引起的非传染性肺炎抑制机理)

修改标题：Mechanism of suppression of nontransmissible pneumonia in mice by Newcastle disease virus.

### 2.有些词语是多余的

经常可以看到缺少实质性内容的空泛标题。

Study on ...      Research on ...      Investigation on ...

既然是学术论文，就应该是“研究”型文章。一本杂志上连篇累牍地出现许多研究、制备、综合，这些不涉及具体内容的标题，更使人感到单调、贫乏。

### 3.介词应用要恰用

➤标题中 of 用得太多是常见问题

➤for、of 经常可以换用

➤标题中第一个字是 on 时可以省略。因为这个 on 译成中文就是“关于”或“论”，这是标题中可有可无的虚词。

★Problem of Eigenvalues of Deterministic and Stochastic Hamiltonian Systems with Boundary Conditions(有边界条件的确定性及随机 Hamilton 系统的特征问题)

Problem of Eigenvalues 可以改为 Eigenvalue Problem，省掉一个 of。Eigenvalue Problem 是一个常用的专门术语。如果要突出 Eigenvalue 也可以用 for 代替 of。

★Linear Programming Method of Optimization of Systems of Partial Differential Equation.

第三个 of 应省掉，改为 Partial Differential Equation Systems。比较前面两个 of，可将第一个改为 for，保留第二个 of，原标题改为：

Linear Programming Method for Optimization of Partial Differential Equation systems.

★On Optimal Damping of One-Dimensional Vibrating Systems.

★On the Determination of some Rheologic Properties of Mechanical Media.

可以将 on 或 On the 去掉，正如以前说过标题中不宜常用 Study of 之类的词。



4.有些冠词可以省略

★A New Method……

★The Problem of……

5.标题太大，看起来像是专著或综述标题

例如：工业自动化中的顺序控制；机床爬行问题的探讨；蒸汽锅炉微机控制系统

6.公式化的标题

由于每个问题的具体内容不同，不可能有标准化的标题表达方法，但是公式化的标题却相当流行。例如，有一种几乎有某种程度的通用模块装配式标题：

★基于 ABC 的 EFG 关键技术(...Based...Key Techniques)

★面向 ABC 的 DEF 系统(...Oriented...system)

只要有了不同的 ABC，EFG 就可以组装成许多不同的标题。

7.新颖化的标题

有些标题看起来似乎新颖，事实上反而掩盖了文章本身的“新意”。这些问题的本质仍然是违背了写论文的根本原则“创新”。最忌讳“新颖化”的标题喧宾夺主。

## 第 3 章 英语文摘的写作

摘要是论文的内容不加注释和评论的简短而扼要的陈述，让读者尽快了解文章主要内容，以补充标题(题名)的不足，并为科技情报检索提供方便。

摘要是整个文章内容的概括。在浩如烟海的文献著作中，读者浏览最多的除了标题就是摘要。只要从摘要中发现确有兴趣而又符合需要的内容时，才看结论。看过结论，感到确有必要时才看文章正文。论文阅读的一般过程是：

标题→摘要→结论→全文

### ►摘要的重要性

为了便于交流，在中文科技期刊上的文章也有必要重视提供英文摘要，因为英文已经成为事实上的，特别是科技领域的国际语言。国际学者首先是，或者说主要是，通过英文摘要来了解中文期刊文献的科技成果，也就是通过英文摘要来帮助我們进行国际学术交流。大概由于这个原因，有关部门规定，学位论文必须有英文摘要；多数中文杂志规定中文学术论文应有英文摘要。

论文能否被收录，基本上是通过英文摘要来确定的。国外科学家通过英文摘要，发现文章内容很有价值，还会要求将全文从中文译成英文。如果摘要质量很差，尽管文章内容不错，人家也很可能置之不理。

## 第 1 节 文摘类型

### ►摘要(Abstract)

摘要一般很短，少则三五行，多则十几行，多为一。其目的是向读者介绍论文或报告的研究课题、论点及其主要方面，但不涉及其具体内容。

### ►概要(Summary)。

概要则较摘要长些，一般为一长段，有时为数段，其目的是向读者概括介绍论文或报告的内容。概要有时放在论文或报告的最后。

概要常见于科技文摘中，主要用于文献检索。如金属文摘(Metal Abstracts)

### ►科技文摘应包含的内容：

★课题研究的背景。即该课题研究的现状和尚存在的问题

★课题研究的主要内容、目的和范围

★课题研究的方法和手段

★课题研究的主要成果(或结果)

★课题研究的结论(有时还包括建议)

### ►摘要的写作要点

摘要方法：将已写完的结果和结论(结束语)，加以提炼、浓缩，去掉不必要的说明、数据



等，突出作者的主要贡献。因此，正确的摘要撰写是以规范化的结束语为前提。为了写好摘要，往往要反过来修改结束语。

★切忌语法错误    ★避免语句结构呆板    ★避免出现无用的词或短语

#### ►关键词问题

关键词一般为 3~6 个。

关键词是文章的关键或重复率最高的词。其作用一是便于情报文献的检索；二是有助于揭示文章主旨。

关键词包括主题词与自由词。前者已规范化，列入主题词表；后者未规范化、未收入主题词表，用以补充表达论文的主题内容。

选择方法：先选取主题词，然后是自由词。但自由词也并不是任选的，必须能起到补充表达论文的主题内容的目的。

主题词的选取最好查阅有关标准。

## 第 2 节 英文文摘的语言特点

大致可以把不同类型的科技文摘所包含的内容化分为以下三个方面：

★介绍科技论文研讨的内容

★介绍课题研究所取得的成果

★介绍与课题研究相关的重要信息

### 一、典型语句

所谓典型语句即写论文摘要时经常用到的语句。这些语句既可以不加改动地直接使用，也可以间接地稍加调整地运用。

为了便于查问使用，将论文摘要内容所涉及的三大方面进行挑选、整理、归纳，所选例句的顺序也考虑到了该类语句在文摘中的出现频率。

#### 1. 回顾研究背景

**review, summarize, present, outline, describe...**

★We **review** evidence for this view of addiction and discuss its implications for understanding the psychology and neurobiology of addiction.

★This paper **outlines** some of the basic methods and strategies and discusses some related theoretical and practical issues.

★We also **summarize** searches for hypothetical particles such as Higgs bosons, heavy neutrinos and super-symmetric particles.

#### [1] 介绍课题研究的进展与现状的语句

通常使用现在完成时态表示已取得的进展和达到的现状。

★ Predictable changes in time domain features have already been extensively reported

【译文】关于时域特征方面的可预测的变化已有大量报道。

★Effective methods that have been developed in recent years in the areas of chromatography and molecular spectroscopy have made it possible to initiate research on the composition of such complex materials as heavy petroleum residua stocks.

【译文】近年来在色谱和分子色谱领域已开发出一些有效的方法，这使得人们可能开始对重油残料等复合材料的成分进行研究。

★In two earlier articles in the Proceedings, the author has outlined a planning and control system for a fashion department and methodology for the timing and calculation of orders, reorders and markdowns as appropriate.

【译文】在前面汇编的两篇文章中，作者简要地叙述了时装部门的计划与控制系统，以及选择订购、续订和削价的时机和计算方法。

#### [2] 介绍尚存在的问题的语句

★Measurement are reported for large pulverized fuel plant and small experimental,

fluidized bed combustion rigs but there are hardly any data relating to industrial boilers.

【译文】对大型粉化燃料装置和小型实验流化床燃料装置都有测试结果报道，但关于工业锅炉却几乎没有任何资料。

★It is well known that the rates of most physical ,chemical and biological processes are affected by temperature. 【译文】众所周知，物理、化学和生物过程的速度都受温度的影响。

★Developing management skills over time is fraught with problems.

【译文】管理技能的开发很长时间以来都面临着不少问题。

### [3]介绍进一步研究的必要性、方向和关键的语句

Need, Necessary, Demand, Requirement, Necessary, Desirable, Important, Should, Expect...

★The commercialization of high-activity zeolite cracking catalysts and the consequent need for reducing the contact time between the feed and catalyst have made it necessary to design and use concurrent-flow(riser)reactoes. 【译文】随着高活性沸石裂化催化剂的商业化以及因此而需要减少加料和催化剂之间的接触时间，需要设计和使用直流（提升）式反应器。

★There are three major factors that contribute to overall melting cost and they should be considered when selecting a melting furnace for aluminum.

【译文】有三个主要因素会增加总体熔炼成本，在选择铝熔炼高炉时需要考虑。

### 2.阐明写作或研究目的

常用词汇：purpose, attempt, aim 等。此外还有动词不定式充当目的状语来表达。如：

★To investigate the mechanism of Bcl-2's effect, we examined whether Bcl-2 interacted with other protein.

★For comparison purposes we present some opacity tables for the Ross-Aller and Cox-Tabor metal abundances.

★With the aim to provide observational constraints on the evolution of the galactic disk, we have derived abundances of Na,Mg,Al,Si,Ca,Ti,Fe,Ni,Y,Ba and Nd,as well as individual photometric ages,for 189 nearby field F and G disk dwarfs.

### 3.介绍论文作者观点和课题内容的语句

介绍科技论文研讨的内容是科技论文摘的一个主要目的，基本语句归纳为六个方面：

- 介绍科技介绍论文内容与作者的观点论文研讨的课题
- 介绍论文涉及的范围
- 综述与概括某一个领域的研究课题
- 介绍论文的重点内容或研究范围

#### [1]介绍论文内容与作者的观点

Present Describe Illustrate Explain Deal with Account for  
Conjecture Support Characterize Prepare argue Disclose  
Involve Report Concern Address Relate to Introduce.....

★The paper presents the data in terms of basic inputs for double and four storied dwellings.

本文阐述了双层和四层住宅的基本投资的数据

★The brief history of pavement recycling is presented. 本文阐述了路面修复的简史

★The author describes the network and technical aspects of a 60-channel communication equipment. 作者描述了一种 60 路通信设备的网络和技术性能

★The model accounts for the contribution of the sheathing to composite action and to lateral load distribution. 该模型解释下外套件对合力相横向负载分布的作用

★The first paper deals with the materials and structural properties...

第一篇论文论述了材料和...的结构性质

#### [2]介绍科技论文研讨课题的语句

Discuss, Study, Investigate, Consider, State, Develop, Survey.....

★The paper examines the multilayer ceramic capacitors and considers the relative merits of one particular single-layer technology

本文研究了多层陶瓷电容并考虑了一种特殊单层技术的相对优越性。

★This paper surveys the applications of distributed parameter filtering to the uniquely chemical engineering system of fixed-bed tubular reactors.

本文考察了如何把分布参数过滤作用应用到化工系统中固定床管状反应器的问题。

★The paper discusses the outlook for intelligent and dumb printers integrated with local networks.

本文研讨了与当地网络联机的智能和非智能打印机的总设想。

★The problem is analyzed for the case of small journal eccentricities.

对小型轴颈地偏心问题进行了分析。

### [3]介绍论文涉及范围的语句

Contain、Cover、Include...

★This issue contains 10 invited technical papers. 本期收入了 10 篇特约技术论文。

★The scope of the research covers asphaltic products and specifications

本研究范围涉及沥青产品和规格。

★Included in the report are the measuring results before and after the following tests: .....

报告中收入了下列试验前后的测量结果: .....

### [4] 综述与概括对某一领域的研究课题的语句

Review 、Summary、Abstract、Outline ...

★The theory of capture mechanisms is reviewed in so far as relevant in the present context

本文综述了与本课题有关的捕捉机构的理论。

★This paper reviews these applications,summarizes the theory from materials science viewpoint, and discuss the instrumentation considerations or extension of the techniques to other studies,and presents more recent application.

本文综述了这些用途,从材料科学的观点概述了这一理论,并考虑了仪器手段或将这一技术用于其它研究,还阐述了更多的近期用途。

★This paper outlines the basic configuration and profile for the new maintenance activities using the new system. 本文概述了使用新系统进行的维修保养的基本程序和轮廓。

### [5] 介绍论文的重点内容或研究范围

Study, present, include, emphasize, focus, Give, attention, emphasis, Place, Concentrate 等。

★Attention is concentrated on...

★There has been a factor on ...

★Particular attention is given/paid to...

★The greatest emphasis has been on...

★The primary emphasis is on...

★... are the main topic of this paper...

○ Here we **study** the dependence of apoptosis on p53 expression in cells from the thymus cortex. [Nature, 1993, 362(6423): 849-852]

○ This article **includes** a brief review of the physics underlying HERWIG, followed by a description of the program itself. [Computer Physics Communications, 1992, 67(3): 465-508]

○ This paper **presents** a detailed analysis of several hundred plant carbon exchange rate (CER) and dry weight (DW) responses to atmospheric CO<sub>2</sub> enrichment determined over the past 10 years. [Agricultural and Forest Meteorology, 1994, 69(3-4): 153-203]

○ This paper **presents** basic methodology of MCMC, **emphasizing** the Bayesian paradigm, conditional probability and the intimate relationship with Markov random fields in spatial statistics. [Statistical Science, 1995, 10(1): 3-41]

○ This paper **focuses** on the promise of artificial neural networks in the realm of modeling, identification and control of nonlinear systems. [Automatica, 1992, 28(6): 1083-1112]

- The **focus** of this paper is the conversion of radiocarbon ages to calibrated (cal) ages for the interval 24 000–0 cal BP (Before Present, 0 cal BP = AD 1950), based upon a sample set of dendrochronologically dated tree rings, uranium-thorium dated corals, and varve-counted marine sediment. [Radiocarbon, 1998, 40(3): 1041–1083]
- We **emphasize** the following points: .... [Journal of the American Statistical Association, 1995, 90(430): 773–795]
- This paper synthesizes, using a common framework, these recent developments together with new ones, with an **emphasis** on flexibility in modeling, model selection, and the analysis of multiple data sets. [Ecological Monographs, 1992, 62(1): 67–118]
- The iterative scheme is .... The main **emphasis** of this paper is on the derivation and analysis of this scheme. [SIAM Journal on Matrix Analysis and Applications, 1992, 13(1): 357–385]
- The paper lays particular **emphasis** on the calculation of posterior probabilities and concurs with others in its view that MCMC facilitates a fundamental breakthrough in applied Bayesian modeling. [Statistical Science, 1995, 10(1): 3–41]
- We draw **attention** to two problems associated with the use of instrumental variables (IV), the importance of which for empirical work has not been fully appreciated. [Journal of the American Statistical Association, 1995, 90(430): 443–450]

★This report concentrates on the geohydrological aspects of the Columbian and Mississippian rocks in the study area. 本报告的重点是该研究地域内的哥伦比亚和密西西比岩的水文地质性质。

★The emphasis is also placed upon the implication of attitudes taken toward industrialized building. 本文的重点还放在对工业建筑所采取的态度意义上。

★Particular attention is paid to the evaluation of the economic current density in the conductors. 特别重视对半导体中的经济电流密度的评估。

★Methods of processing, effects of process variables on oil quality, how quality is measured are the main topic of this paper.

加工方法、加工变量对油质量的影响以及质量如何检测等是本文的主要课题。

#### 4.方法介绍部分

[1] 介绍研究或试验过程, 常用词汇有: test, study, investigate, examine, experiment, discuss, consider, analyze, analysis 等. 例如:

- We use N-body simulations to **investigate** the structure of dark halos in the standard cold dark matter cosmogony. [Astrophysical Journal, 1996, 462(2): 563–575]
- We present an **analysis** of atmospheric neutrino data from a 33.0 kton yr (535-day) exposure of the Super-Kamiokande detector. [Physical Review Letters, 1998, 81(8): 1562–1567]
- We **tested** this hypothesis in various human T cells: (1) malignant Jurkat cells, (2) an alloreactive T-cell clone (S13), and (3) peripheral ATC. [Nature, 1995, 373(6513): 438–441]
- We **study** objects with masses ranging from those of dwarf galaxy halos to those of rich galaxy clusters. [Astrophysical Journal, 1996, 462 (2): 563–575]

○ This paper **examines** how the molecular shapes of covalent organosilanes, quaternary ammonium surfactants, and mixed surfactants in various reaction conditions can be used to synthesize silica-based mesophase configurations,... [Chemistry of Materials, 1996, 8 (5): 1147–1160]

○ Numerical **experiments** indicate also that the new variant, named Bi-CGSTAB, is often much more efficient than CG-S. [SIAM Journal on Scientific and Statistical Computing, 1992, 13(2): 631–644]

○ This paper **discusses** a class of models for the marginal expectations of each response and for pairwise associations. [Journal of the Royal Statistical Society Series B - Methodological, 1992, 54(1): 3–40]

[2] 说明研究或试验方法, 常用词汇有: measure, estimate, calculate 等. 例如:

○ We have developed a global model to **estimate** emissions of volatile organic compounds from natural sources (NVOC). [Journal of Geophysical Research – Atmospheres, 1995, 100(D5): 8873–8892]

○ This study presents **estimates** of lifetime and 12-month prevalence of 14 DSM-III-R psychiatric disorders from the National Comorbidity Survey,... [Archives of General Psychiatry, 1994, 51(1): 8–19]

○ To calibrate our maps, we assume a standard reddening law and use the colors of elliptical galaxies to **measure** the reddening per unit flux density of 100  $\mu\text{m}$  emission. [Astrophysical Journal, 1998, 500(2): 525–553]

○ We also provide a step-by-step analytic procedure, based on the Press-Schechter formalism, that allows accurate equilibrium **profiles** to be **calculated** as a function of mass in any hierarchical model. [Astrophysical Journal, 1997, 490(2): 493–508]

[3] 介绍应用、用途, 常用词汇有: use, apply, application 等. 例如:

○ Our program **uses** a maximum likelihood approach and is based on version 3.3 of Felsenstein's dnaml program. [Computer Applications in the Biosciences, 1994, 10(1): 41–48]

○ As an **application**, we implement a compact image coding algorithm that selects important edges and compresses the image data by factors over 30. [IEEE Transactions on Pattern Analysis and Machine Intelligence, 1992, 14(7): 710–732]

○ We **used** RELEASE for data summary and goodness-of-fit tests and SURGE for iterative model fitting and the computation of likelihood ratio tests. [Ecological Monographs, 1992, 62(1): 67–118]

○ **Using** the phoA gene and phoA fusions to monitor expression in these vectors, we show that the ratio of induction/repression can be 1,200-fold, compared with 50-fold for P-TAC-based vectors. [Journal of Bacteriology, 1995, 177(14): 4121–4130]

○ We **apply** the network to the source separation (or cocktail party) problem, successfully separating unknown mixtures of up to 10 speakers. [Neural Computation, 1995, 7(6): 1129–1159]

## 5. 结果介绍部分

[1] 展示研究结果, 常用词汇有: show, result, present 等. 例如:

□ We **show** this cell death to be dependent upon expression of c-myc protein and to occur by apoptosis. [Cell, 1992, 69(1): 119–128]

□ Our **results** suggest a widespread role for the nitric oxide-cyclic guanosine monophosphate system in the nervous system. [Neuroscience, 1992, 46(4): 755–784]

□ Recent research **had shown** that orally administered resveratrol lowered lipid levels in the liver of rats. [American Journal of Enology and Viticulture, 1992, 43(1): 49–52]

□ Our **results show** that p53 exerts a significant and dose-dependent effect in the initiation of apoptosis, but only when it is induced by agents **that** cause DNA-strand. [Nature, 1993, 362(6423): 849–852]

□ The **results** we obtained demonstrate that this technique will contribute to our understanding of the genetic diversity of uncharacterized microbial populations. [Applied and Environmental Microbiology, 1993, 59(3): 695–700]

□ We **present** the **results** of two exploratory parsimony analyses of DNA sequences from 475 and 499 species of seed plants, respectively, representing all major taxonomic groups. [Annals of the Missouri Botanical Garden, 1993, 80(3): 528–580]

□ We **present** a simple derivation of a simple GGA, in which all parameters (other than those in LSD) are fundamental constants. [Physical Review Letters, 1996, 77(18): 3865–3868]

[2] 介绍结论, 常用词汇有: summary, introduce, conclude 等. 例如:

□ We **introduce** a procedure, SureShrink, that suppresses noise by thresholding the empirical wavelet coefficients. [Journal of the American Statistical Association, 1995, 90(432): 1200–1224]

□ By means of informal mathematical arguments, simulations and a series of worked examples, we **conclude** that PQL is of practical value for approximate inference on parameters and realizations of random effects in the hierarchical model. [Journal of the American Statistical Association, 1993, 88(421): 9–25]

□ We give a **summary** of the main physics component of the current versions, PYTHIA 5.7 and JETSET 7.4: hard-scattering matrix elements, parton distributions, initial- and final-state radiation, multiple interactions, beam remnants, fragmentation and decays. [Computer Physics Communications, 1994, 82(1): 74–89]

## 6. 介绍论文成果的句子

- |            |         |         |         |
|------------|---------|---------|---------|
| ➤ 成果的获取和开发 | ➤ 观察和证明 | ➤ 运算和计量 | ➤ 应用与用途 |
| ➤ 评估与比较    | ➤ 试验与实验 | ➤ 论证与依据 | ➤ 推荐与依据 |

### [1] 介绍成果的获得可开发的句子

Give, Develop, Provide, Derive, Establish, Design, Solve, Record, Reduce, Furnish, Require,



Realize, Achieve, Produce, Design, Construct, Improve, Deduce, Obtain, Select...

☐ *This paper provides the quantitative background to an assessment of the fuel consumption impacts of UTM(Urban Transport Management).*

【译文】本文为评估城市交通管理对燃油消耗的影响提供了量化基础。

☐ *The authors have developed two methods of reactor design.*

【译文】作者制定了设计反应器的两种方法。

☐ *This paper establishes a profile of executive directors who control and implement strategy within the boardroom of Britain's largest companies.*

【译文】本文确立了执行董事的要求,所谓执行董事就是在英国大公司董事会办公室里制定和实施策略的人。

☐ *A theoretical model has been developed to predict the radiation properties of this antenna for various feed configurations.*

【译文】研制了一种理论模型来预测这种天线用于各种馈电方式时的辐射性能。

☐ *The theory is developed in a quasistationary approximation for the particles whose heat-conduction coefficient is much larger than heat-conduction coefficient of the gas mixture.*

【译文】建立该理论是为了对那些热传导系数明显大于混合气体热传导系数的颗粒作准稳定逼近。

☐ *Significant and predictive trends were established.*

【译文】本文确立了重大的预测趋势。

*The system is designed to be used in a cardiovascular research and laboratory environment.*

【译文】设计此系统的目的是用于心血管研究和实验室环境。

☐ *Effects of stator resistance on the air gap flux are also recorded experimentally.*

【译文】定子阻力对气隙流的影响也作了实验记录。

☐ *A dissolution diagram was constructed which can be used in heat treatment.*

【译文】建立了一个溶解图,可用于热处理。

## [2] 介绍观察和证明的语句

Show, Observe, Find, Demonstrate, Note, Confirm, Indicate, Exhibit, Identify, Point out

★All the salts studied, except NaCl, exhibit good catalytic activity.

所研究的所有盐类,除氯化钠之外,都有很好的催化作用。

★Application fields for these types of reactions are indicated.

本文指出了这几种反应的使用领域。

★In this paper, it is demonstrated that with the same initial hypothesis the exact solution can be obtained directly by using the method of direct transference.

本文证明,在相同的初始假设条件下使用直接转移法可直接获得准确答案。



☐ *Studies have shown that chemical comminution of coal with ammonia is an attractive method for the size reduction of coal and the selective liberation of inorganic constituents.*

【译文】研究表明,用氨对煤炭进行粉碎,是一种十分有效的粉碎方法,同时它能对无机构成物进行选择性的释放。

☐ *The treatment procedure developed according to tests on the pilot plant is described, and the paper notes that it has proven successful in practice.*

【译文】本文描述了根据试验装置而制定的处理程序,并且指出这一程序在实践中证明十分成功。

☐ *Other factors influence the choice of a particular furnace and these are pointed out as the various types of furnaces are discussed.*

【译文】还有其他因素影响高炉的选择,这些因素在讨论各种类型的高炉时将予以指出。

☐ *A relationship is observed between the apparent viscosity and the particle coupling ratio  $R_p$ .*

【译文】本文观察了视黏度与颗粒耦合比  $R_p$  之间的关系。

### [3]介绍运算与计算的语句

Calculate, Estimate, Measure, Determine, Work out...

☐ *The authors determined the cooling rate for reducing the temperature difference between the inner side and the outer side of the silica brick in order to decrease circumferential stress in the case of cooling.*

【译文】作者确定了冷却速度,以减少硅石砖内外面的温差来降低冷却时的周边压力。

☐ *The model parameters are estimated using a recursive extended least square method.*

【译文】模型的参数是用递归扩展最小二乘方法估算的。

☐ *The main body orientation is measured by means of infrared Earth observation.*

【译文】主体定位是通过大地紫外线观测计量的。

### [4]介绍应用与用途的语句

Use, Apply...

☐ *These facilities have been used for eight years to develop and maintain weapon system software for several projects.*

【译文】这些设施已使用 8 年,用来为若干个项目研制和维护武器系统软件。

☐ *Such a statistical method has been applied to an ensemble of small irregular particles by averaging over a range of electromagnetic microstates.*

【译文】通过对一组电磁微态取均值的办法已将这样一种统计法用于一系列不规则的微小颗粒。

☐ *The method is used to study the normal distribution and the Weibull distribution.*

【译文】这种方法用来研究正态分布和维泊尔分布。

### [5]介绍评估与比较的语句

Evaluate, Assess, Compare, Agree with, Be consistent with...

☐ *The calculated results agree with experimental results with regard to the effects of machine stiffness, work hardening rate and crossed speed on stress amplitude.*

【译文】就机械刚度、加工硬化速度和交错速度对应力幅度的影响而言,计算结果与实验结果完全一致。

☐ *The results obtained by adding magnesium oxide to fuel oil burned in the steam generator over a long period of time are compared with those obtained with the use of the additive for a short period of time.*

【译文】往蒸汽发生器燃油里长期添加氧化镁,其燃烧结果与短时间使用添加剂的结果进行了比较。

## [6] 介绍试验与实验的语句

Test, Experiment...

☐ *Experiments have been carried out using a continuous flow back-mixed emulsion polymerization reactor.*

【译文】我们使用连续反混乳液聚合反应器进行了实验。

☐ *The tests were carried out on a unit which included the investigated horizontal reactor.*

【译文】试验是在一台包括这里所研讨的水平反应器的装置上进行的。

☐ *The tests were designed to determine the configuration of the liquid streams, the film thickness, the homogenization time and the mixing power.*

【译文】试验是设计用来确定液体流的外形、薄膜的厚度、均质化时间和混合能力的。

☐ *Push pull fatigue tests have been carried out in the annealed and cold-worked conditions.*

【译文】推拉疲劳试验是在退火和冷加工条件下进行的。

## [7] 介绍结论与依据的语句

Be based on, Based on, Take as reference...

☐ *The method is based on the bang-bang approach which incorporates an asymmetrical control strategy to allow load disturbance.*

【译文】这种方法的基础是开关式,它包括一种能承受负载扰动的不对称控制策略。

☐ *This study is based on spatial analysis, via hypothesis testing and model comparisons, of costs in dollars for 100-pound shipments in commodity classes or ratings of 77.5 and 100.*

【译文】此项研究的基础是空间分析,通过假设验证和模型比较,对商品等级或运费率为77.

## [8] 关于推荐与建议的语句

Propose, Suggest, Recommend...

☐ *The author proposes an approach to the creation of an integrated method of investigating and designing objects, based on a local computer system.*

【译文】作者建议创立一种综合法,以当地计算机系统为基础来进行物体研讨与设计。

☐ *A method is proposed for calculating the initial external field strength.*

【译文】本文提出了一种计算初始外部场强的方法。

☐ *It is suggested that elongated cells with the same orientation as that of the recrystallization texture are the site or recrystallization nuclei.*

【译文】有人提出,与再结晶组织的方向相同的细长晶粒是再结晶核的存在场所。

☐ *This paper first proposes a methodology for the identification of the spatial variability of the infiltration transfer.*

【译文】本文先提出了一种方法来认定渗透转移的空间变化。

## 7.讨论部分

[1] 陈述论文的论点和作者的观点，常用词汇有：suggest, report, present, explain, expect, describe 等。

例如：

- ☐ The results **suggest** that abnormalities in male sex development induced by p,p'-DDE and related environmental chemicals may be mediated at the level of the androgen receptor. [Nature, 1995, 375(6532): 581–585]
- ☐ In this study, we **describe** a psychobiological model of the structure and development of personality that accounts for dimensions of both temperament and character. [Archives of General Psychiatry, 1993, 50(12): 975–990]
- ☐ We **report** here that immature thymocytes lacking p53 die normally when exposed to compounds that may mimic T-cell receptor engagement and to glucocorticoids but are resistant to the lethal effects of ionizing radiation. [Nature, 1993, 362(6423): 847–849]
- ☐ We **present** the derivation of a new molecular mechanical force field for simulating the structures, conformational energies, and interaction energies of proteins, nucleic acids, and many related organic molecules in condensed phases. [Journal of the American Chemical Society, 1995, 117(19): 5179–5197]
- ☐ Exciting new research has **elaborated** several important and unexpected findings that **explain** mechanisms involved in the activation of NF-kappa B. [Annual Review of Immunology, 1996, 14: 649–683]
- ☐ We **expect** the uncertainties in the relative ages to be about 25%, although the absolute errors may be larger. [Astronomy and Astrophysics, 1993, 275(1): 101–152]

[2] 阐明论证，常用词汇有：support, provide, indicate, identify, find, demonstrate, confirm, clarify 等。

例如：

- ☐ We showed that it is possible to **identify** constituents which represent only 1% of the total population. Applied and Environmental Microbiology, 1993, 59(3): 695–700
- ☐ These results **demonstrate** that p53 is required for radiation-induced cell death in the thymus but is not necessary for all forms of apoptosis. [Nature, 1993, 362(6423): 847–849]
- ☐ Our conclusions are **supported** by a rigorous statistical analysis of hundreds of millions of high quality Ethernet traffic measurements collected between 1989 and 1992, coupled with a discussion of the underlying mathematical and statistical properties of self-similarity and their relationship with actual network behavior. [IEEE-ACM Transactions on Networking, 1994, 2(1): 1–15]

- Here we **provide** evidence from direct experimental manipulation of diversity by over an order of magnitude, using multi-trophic level communities and simultaneous measures of several ecosystem processes, that reduced biodiversity may indeed alter the performance of ecosystems. [Nature, 1994, 368(6473): 734–737]
- Hybridization with human DNA and RNA **indicates** a high degree of conservation of these genes in other vertebrates. [Proceedings of the National Academy of Sciences of the United States of America, 1992, 89(14): 6511–6515]
- Our studies **indicate** that major histocompatibility complex class I-restricted CD8(+) cytotoxic T lymphocytes are activated in response to newly synthesized antigens, leading to destruction of virus infected cells and loss of transgene expression. [Journal of Virology, 1995, 69(4): 2004–2015]
- We **find** consistent calibration using the B-R color distribution of a sample of the 106 brightest cluster ellipticals, as well as a sample of 384 ellipticals with B-V and Mg line strength measurements. [Astrophysical Journal, 1998, 500(2): 525–553]
- We **find** that p21 inhibits the activity of each member of the cyclin/CDK family. [Nature, 1993, 366(6456): 701–704]
- Finally, we **demonstrate** that deregulated c-myc expression induces apoptosis in cells growth arrested by a variety of means and at various points in the cell cycle. [Cell, 1992, 69(1): 119–128]
- Here we **present** records of sea surface temperature from North Atlantic sediments spanning the past 90 kyr which contain a series of rapid temperature oscillations closely matching those in the ice-core record, **confirming** predictions that the ocean must bear the imprint of the Dansgaard-Oeschger events<sup>2,3</sup>. [Nature, 1993, 365(6442): 143–147]
- We **clarify** how this trade-off is intimately involved in the evolution of secondary sexual characteristics and how it may explain some of the equivocal empirical results that have surfaced in attempts to quantify parasite's effect on sexual selection. [American Naturalist, 1992, 139(3): 603–622]

[3] 推荐和建议，常用词汇有：suggest, suggestion, recommend, recommendation, propose, necessity, necessary, expect 等。例如：

- The authors **suggest** that the most promising route to effective strategies for the prevention of adolescent alcohol and other drug problems is through a risk-focused approach. [Psychological Bulletin, 1992, 112(1): 64–105]
- We **propose** two algorithms to estimate the significance level for a test of HWP. [Biometrics, 1992, 48(2): 361–372]
- We **suggest** that information maximization provides a unifying framework for problems in “blind” signal processing. [Neural Computation, 1995, 7(6): 1129–1159]
- This article **suggests** that delinquency conceals 2 distinct categories of individuals, each with a unique natural history and etiology: A small group engages in antisocial behavior of 1 sort or another at every life stage, whereas a larger group is antisocial only during adolescence. [Psychological Review, 1993, 100(4): 674–701]

□ We **propose** that the formation of these materials takes place by means of a liquid-crystal ‘templating’ mechanism, in which the silicate material forms inorganic walls between ordered surfactant micelles. [Nature, 1992, 359(6397): 710–712]

□ We **propose** a new framework for solving the hierarchy problem which does not rely on either supersymmetry or technicolor. [Physics Letters B, 1998, 429(3–4): 263–270]

□ In this paper, another variant of Bi-CG is **proposed** which does not seem to suffer from these negative effects. [SIAM Journal on Scientific and Statistical Computing, 1992, 13(2): 631–644]

□ Using the double module for constructions of in-frame substitutions of genes, only one transformation experiment is **necessary** to test the activity of the promotor and to search for phenotypes due to inactivation of this gene. [Yeast, 1994, 10(13): 1793–1808]

□ I **expect** that R(T)free will provide a measure of the information content of recently proposed models of thermal motion and disorder 6–8, time-averaging 9 and bulk solvent 10. [Nature, 1992, 355(6359): 472–475]

### 第3节 语言结构特点

#### 一、句型

一般用被动句。有三种常用句型：

- 主语 + 修饰语 + 被动语态  
长主语                      短谓语

□ *The detailed characterization of a rotating arm collector to sample ambient fog droplets for chemical analysis is presented.*

【译文】本文阐述了一种用来采集周围雾滴进行化学分析的回转臂采集器的详尽特征。

□ *The energy consumption of a pressure die-casting foundry for aluminum alloys, equipped with two large combustion melting furnaces and four little holding and freezing furnaces, also combustion-fired, with particular features to ensure a fixed annual output is discussed.*

【译文】本文探讨了用两台大型熔炉和四台小型储存和输送炉进行铝合金压模时的能量消耗问题。

- 主 语 + 被动语态 + 分组修饰语  
短主语                      短谓语

The data are presented on the possibilities of rational utilization of cracking catalyst

本文提供了有关合理利用裂化催化剂的可能性的资料。

- 主语 + 修饰语 + 被动语态 + 补足成分  
短主语                      长谓语

这实际上是句型一的扩充。扩充的补足成分进一步说明范围、目的、手段、条件、时间等。

The results obtained by adding magnesium oxide to fuel oil burned in the steam generator over a long period of time are compared with those obtained with the use of the additive for a short period of time. 往蒸汽发生器燃油里长期添加氧化镁，其燃烧结果与短时间使用添加剂的结果进行



了比较。

## 二、时态

经常使用的时态有三种：

- 一般现在时：使用最为普遍。这一时态表示介绍的是客观事实。
- 现代完成时：表示已取得的成果和完成的工作
- 一般过去式：多用于介绍已进行的实验、试验或过程。

★在介绍背景资料时，应该用一般现在时态来叙述不受时间影响的普遍事实。若介绍背景资料的句子内容是对某种研究动向的概述，则应使用现在完成时态。

- Most alternative fuels for internal combustion engines have low cetane numbers.
- This is particularly true of natural gas which has excellent clean burning characteristic and low greenhouse gas production.
- The use of correlated coefficients of heat transfer from the experimental data has been the universal choice to analyze complex heat transfer processes.
- Several laboratory studies have been conducted to determine actual decomposition rates of wheat and other small grain straws using  $^{14}\text{C}$ -labeled plant material.

★在叙述研究目的、研究题目或活动时，若文章采用“研究导向”型，则句子的动词使用一般过去时态(有少数作者会使用现在完成时，不过使用一般过去时较恰当)。若文章采用“论文导向”型，则应该使用一般现在时态。

研究导向：

- The objective of this research was to determine the variability of soil  $\text{CO}_2$  temporally, spatially, and with depth in two acid soils in a mountainous, forested catchment.
- In this study, we examined vertical nutrient mixing in late summer in a test area 15 kilometers off the coast.

论文导向：

- This paper presents an auto-refrigerating cascade cycle that employs a rectifying column.
- In this paper, we focus on the solder metallurgy and stress-induced laser behavior after mounting.

★在摘要的实验部分的写作中，实验程序或方法通常使用一般过去时态来描述。

- Experiments on high-enthalpy water blowdown through a short converging nozzle were performed to measure the critical discharge flowrate under different stagnation conditions.
- The measurements were carried out in a high pressure chamber (HPC) and in a rapid compression machine (RCM).
- We use FASTCAP to compute the values of the capacitances, and a closed form formula to obtain the inductance values.

有的作者会用一个句子来同时表达研究目的或题目和研究方法。一种写作方法是使用主句来指出研究目的,短语用于描述研究方法。另一种方法是采用位于句首或句末的短语来表示研究目的,并使用主句以描述研究方法。

- In the sensor part of the system, the quality of combustion inside the furnace is evaluated *by means of three parameters—the Combustion Center Point (CCP), the Refuse Mass Energy (RME) and the Air Balance in Future (ABF)*.
- Laboratory compaction and triaxial compression tests were performed *to assess the compaction characteristics and load deformation response of a sandy silt reinforced with randomly oriented recycled carpet fibers*.

★通常使用一般过去时态概述主要结果(也有一些作者用现在时态)。但若作者认为自己的研究结果普遍有效,而不只是在本次研究的特定条件下才适用,则可以使用一般现在时态。

- The properties of hot water dried products were very sensitive to process temperature.
- The plant's thermal efficiency was increased from 17.6% to 21.3% for the single Rankine cycle by the adoption of the two-fluid cycle, using  $C_6H_6$  as the working fluid under a constant condition of the topping steam temperature of 295℃.

★使用一般现在时态、推测动词或 may、should、could 等情态动词来叙述结论或推论。至于文献回顾性(或综述性)的文章,摘要只是叙述文章的内容概要,而不包含一些特别的研究结果,因此通常都用现在时。

- These results suggest that an appropriate agreement of the elliptic tube enhance the heat transfer performance of the tube bank.
- In general, dry compression is more favourable than wet compression.
- The result can be expected to be of great technical interest as basic data for the use of the ball bearing in space cryogenic instrument.

## 第4节 摘要写作的几点建议

➤摘要的长度要适宜。摘要中不能省略冠词,也不应该单独使用研究论文中出现的名词或词组的缩写,还应极力避免采用那些对你研究工作不熟悉的读者不明白的专门术语。

➤摘要的句子不能重复论文中的句子。不要直接抄录论文主要部分中的句子,而对句子的结构与内容不作任何修改。因为摘要必须在篇幅很短的情况下概述很多信息。摘要中句子的功能和论文主要部分中句子的功能稍有不同,所以论文主要部分中所使用的句子往往不适合直接在摘要中再次使用。有些学生在刚开始撰写论文时,常常会在摘要、导论及结论中都重复同样的句子,这是不妥当的。

➤避免在摘要中列出一大堆数据。摘要的内容必须能让读者清楚地了解作者究竟进行了什么样的研究工作,为什么要做这些研究,而且究竟得到了什么样的结果。应该用句子的方式来说明白己的研究,最多只



引述几个关键的数据供读者参考。

➤完成研究论文后再写摘要。一个可行的办法是，先将论文通读，再划出论文中的关键句子和要点，然后将它们串联起来，编写成简明而具综合性的摘要。注意不要重复论文中的句子。

➤撰写“约定”摘要必须慎重。

学术会议的论文摘要必须在会议前的 8 至 12 个月就要交，这类摘要叫做“约定”的摘要。

请牢记：写“约定”摘要实际上牵涉到一个研究者的道德水准和学术可信性的问题。所写的“约定”摘要必须是你最终要提交的论文的正确反映，两者的内容应该保持一致。若“约定”摘要写得言过其实，则很有可能会被认作有作“虚假广告”之嫌。

有经验的研究者在撰写“约定”摘要时常采用下列方法：十分正确地预见最终的研究结果；提出引人注意的观点，但不使用大量的实际数据资料；对于研究工作中有可能发生的意外结果，避免作正面描述。如果要写一个“约定”摘要，初学者最聪明的做法是向那些资深的专家请教。

## 第5节 实例讲解

### Al-C 在机械合金化过程中的结构变化

#### Structural evolution of Al-C mixture during mechanical alloying

**摘要:** 针对 C 原子的扩散过程,研究了 Al-石墨在机械合金化过程中的结构变化.用 X 射线衍射仪(XRD)、扫描电子显微镜、拉曼光谱仪及计算机模拟观察,分析了不同球磨时间的 Al-C 混合物的结构.结果表明,球磨初期,石墨晶粒尺寸的减小及六角石墨转变为 Turbostratic 结构,使石墨的 X 射线衍射峰迅速减弱,以至消失.随球磨时间的增加,C 原子逐渐扩散到 Al 的点阵中形成固溶体.将 Al-C 固溶体进行退火处理,便转变为  $\text{Al}_4\text{C}_3$ .即使在球磨产物的 XRD 图中观察不到石墨的衍射峰后,继续球磨数十小时,拉曼光谱表明球磨样品中仍有未与 Al 反应的单质石墨.

**关键词:** 机械合金化;X 射线衍射(XRD);拉曼光谱;固溶

**Abstract:** Aimed at the diffusion process of C atoms, the structural evolution of Al-C mixture during mechanical alloying was studied. By using X-ray diffraction (XRD), scanning electron microscopy (SEM), Raman spectroscopy and computer simulation, the structure of Al-C mixture milled for different hours was characterized. Experimental results show that the decreased grain size of graphite and the transformation from hexagonal graphite to Turbostratic structure make the diffraction peaks of graphite decrease rapidly, even disappear in the initial stage of milling. C atoms diffuse into Al lattice, and an Al-C solid solution is formed during further milling. The Al-C solid solution transforms into  $\text{Al}_4\text{C}_3$  during annealing. Raman spectra confirm that elemental graphite still exists in the samples further milled for several tens of hours after the diffraction peaks of graphite has completely disappeared in the XRD patterns of the milled product.

**Key words:** mechanical alloying; X-ray diffractometry (XRD); Raman spectroscopy; solid solution

### Al-Fe-V-Si (Nd) 合金纳米晶粉末的制备及相转变的研究

#### Preparation and phase transformation of Al-Fe-V-2Si(Nd) nanocrystal powder

**摘要:** 利用机械合金化方法制备 Al-Fe-V-Si(Nd) 合金粉末,球磨状态下得到合金粉末由铝固溶体组成,经适当的热处理后,得到  $\alpha\text{-Al}_{13}(\text{Fe},\text{V})_3\text{Si}$  粒子弥散分布的合金粉末.加入稀土后,合金粉末的组织得到细化,并出现非晶化的趋势.利用 DMA 方法可以直接得到具有  $\alpha\text{-Al}_{13}(\text{Fe},\text{V})_3\text{Si}$  粒子弥散分布的合金粉末,并观察到  $\alpha\text{-Al}_{13}(\text{Fe},\text{V})_3\text{Si}$  转变为准晶的现象,从而证实了准晶相与  $\alpha\text{-Al}_{13}(\text{Fe},\text{V})_3\text{Si}$  之间的强烈关联性.

**关键词:** 纳米晶; Al-Fe-V-Si; Al-Fe-V-Si-Nd; 机械合金化; 相变

**Abstract:** Al-Fe-V-Si(Nd) nanocrystal powder was prepared by mechanical alloying, and was composed of Al solid solution.  $\alpha\text{-Al}_{13}(\text{Fe},\text{V})_3\text{Si}$  precipitates were formed after heat treatment of milled powder. Addition of Nd element refined grain structure of milled powder and resulted in amorphous phase formation. Milled powder with  $\alpha\text{-Al}_{13}(\text{Fe},\text{V})_3\text{Si}$  precipitates could be prepared by DMA method, and phase transformation of  $\alpha\text{-Al}_{13}(\text{Fe},\text{V})_3\text{Si}$  to quasicrystal was observed, indicating direct relationship between these two phases.

**Keywords:** Nanocrystal; Al-Fe-V-Si; Al-Fe-V-Si-Nd; Mechanical alloying; Phase transformation

# Al-Zn-Mg-Cu 系超高强铝合金的研究进展\*

## Progress in Research on Ultra High Strength Al-Zn-Mg-Cu Alloy

**摘要** 评述了国内外超高强铝合金的研究及应用概况,介绍了 Zn、Mg、Cu 等主要元素与 Zr、Sc、Li、Ag、Be 及稀土等微量元素对 Al-Zn-Mg-Cu 系超高强铝合金组织与性能的影响,介绍了 Al-Zn-Mg-Cu 系合金制备技术、热处理工艺及其最新进展,讨论了超高强铝合金主要强化机制以及微观组织与性能之间的关系。针对超高强铝合金现存的问题,提出了今后研究开发的方向。

**关键词** 超高强铝合金 合金化 热处理 显微组织

**Abstract** The process of the research and application of ultra high strength aluminum alloys are reviewed in this paper. The effects of the main hardening elements (as Zn, Mg, Cu) and the trace elements (Zr, Sc, Li, Ag, Be and Re) addition on the microstructure and mechanical properties are introduced. The technology of preparing and heat treatment of ultra high strength alloy and their new progress are introduced. The relations between its microstructures and properties as well as key mechanism of strengthening aluminum alloy are discussed. In the end, basing on the existing problems of the present study, some suggestions for the futural exploration and research of ultra high strength aluminum alloys are put forward.

**Key words** ultra high strength aluminum alloy, alloying, heat treatment, microstructure

## AZ31B 镁合金塑性变形动态再结晶的实验研究

**摘要:** 通过不同应变速率和不同温度下的轴对称压缩试验,研究了 AZ31B 镁合金塑性变形与动态再结晶的相互依赖关系。研究证实,温度  $T$  在 200 ℃~400 ℃ 区间、变形程度  $\varepsilon$  约 0.2 左右时,开始出现动态再结晶 (DRX) 现象。随变形程度的增加,DRX 晶粒不断增多,材料呈现明显的软化趋势,流动应力下降。当 DRX 过程完成以后,继续变形,材料又出现硬化行为。为镁合金塑性变形组织演变的定量研究打下了基础。

**关键词:** AZ31B; 塑性变形; 动态再结晶; 轴对称压缩

## The experimental study on recrystallization of magnesium alloy AZ31B during plastic deformation

**Abstract:** The relationship between the dynamic recrystallization (DRX) and plastic deformation of the magnesium alloy AZ31B by axisymmetric compression tests at different strain rate and different temperature is investigated. Studies show that AZ31B presents dynamic recrystallization behavior at 200~400 ℃ in temperature and around 0.2 in strain. With deformation increased, amount of DRX grains arises, the materials presents obvious tendency of softening, and flow stress declines as well. After the completion of DRX process, the material is hardened again if deformation continues. This paper provides the foundation for the quantitative analysis of microstructure evolution of magnesium alloys during plastic deformation.

**Key words:** AZ31B; plastic deformation; dynamic recrystallization; axisymmetric compression

## Mg-Y-Nd 合金的蠕变行为及其微观机制 \*

**摘要** 以恒应力方式在 Mayes 试验机上对自行研制的铸造 Mg-Y-Nd 合金进行了压缩蠕变实验, 结果表明: 在温度低于 300 °C、应力低于 100 MPa 条件下, Mg-Y-Nd 合金具有极其优良的蠕变性能, 特别是在 200 °C 时, 该合金的稳态蠕变速率较 Mg-Zn-Ce 合金和普通的 AZ80, AM60 合金降低约 3 个数量级; 滑移和孪生是 Mg-Y-Nd 合金蠕变变形的基本方式; 大量的  $\beta$  相和蠕变期间沉淀相动态析出产生的沉淀强化和晶界强化是提高该合金蠕变抗力的主要机制, MgO 质点薄层 (在  $\alpha$ -Mg/ $\beta$  相界面间) 及其独立聚合区 (脱离  $\beta$  相) 的生成、动态再结晶的发展和初生  $\beta$  相的断裂是降低该合金蠕变抗力的主要原因。

**关键词** Mg-Y-Nd 合金, 蠕变, 沉淀强化, MgO 质点

## GREEP BEHAVIOR AND MICROSCOPIC MECHANISM OF Mg-Y-Nd ALLOY

**ABSTRACT** The compress creep tests of the cast Mg-Y-Nd alloy were carried out at constant stress on Mayes fatigue machine in air. The results show that the creep resistance of the Mg-Y-Nd alloy is much higher when the temperature is lower than 300 °C for stress of 100 MPa, especially the steady creep rate at 200 °C decreases about three orders of magnitude than those of the Mg-Zn-Ce alloy and common AZ80 and AM60 alloys. Slipping and twinning are the fundamental modes of creep deformation for the alloy, the  $\beta$  phases and dynamic precipitations during creep are the principal strengthening mechanism of the alloy, whereas the main reason for the decrease of the creep resistance is attributed to occurrence of the MgO particles at the interface between  $\alpha$ -Mg matrix and  $\beta$  phase, dynamic recrystallization as well as the fracture of the primary  $\beta$  phases.

**KEY WORDS** Mg-Y-Nd alloy, creep, precipitation strengthening, MgO particle

## 7075-T7651 铝合金厚板热处理工艺研究

### Study of Heat Treatment Process of 7075-T7651 Aluminium Alloy Plate

**摘要:**研究了 7075 合金淬火温度、转移时间、停放时间、双级时效等因素与组织性能的关系, 确定了 7075-T7651 厚板的生产制度: 淬火温度为 470°C, 转移时间 25s 内, 拉伸量 1.5%~2.5%, 淬火到时效的间隔时间 24 h 内, 双级时效制度为 120°C 5h+160°C 18h, 其中二级时效温度是影响板材综合性能的主要因素。

**关键词:**7075 铝合金; T7651 状态; 厚板; 淬火; 双级时效

**Abstract:** The relations of quenching temperature, transfer time, double aging with structure and properties of Alloy 7075, are studied. The production institutions of 7075-T7651 plate are determined. The quenching temperature is 470°C. The transfer time is within 25 seconds. The pre-stretching deformation is 1.5%~2.5%. The interval time from quenching to aging is less than 24 h. The double aging institutions are at 120°C for 5 h and 160°C for 18 h. Among them, the second aging temperature is the primary factor to affect general properties of the plate.

**Key words:** aluminum alloy 7075; T7651 temper; plate; quenching; double aging

# LY12CZ 挤压棒材粗晶环微观分析<sup>①</sup>

**摘 要** 通过微观组织分析,研究了 LY12 挤压棒材在固溶处理前进行足够的冷拔变形可消除其粗晶环的现象。足够的冷变形增加了再结晶的形核率,改变了第二相粒子、残余应力的分布,从而获得了均匀的细晶组织,消除了粗晶环。由此还分析了 LY12CZ 挤压棒粗晶环形成的原因,即挤压过程中棒材边部剧烈的剪切变形使其具有很大的畸变能,促使第二相粒子聚集长大而失去对再结晶的抑制作用,在随后的淬火加热过程中发生一次再结晶而聚集长大形成粗晶环。

**关键词** LY12 铝合金 粗晶环 冷拉拔

## MICROSTRUCTURE ANALYSIS OF COARSE-GRAIN RECRYSTALLIZATION ANNULUS OF EXTRUDED BARS OF LY12CZ ALUMINIUM ALLOY

**ABSTRACT** It has been studied by analyzing the microstructure that the coarse-grain recrystallization annulus in directly extruded LY12 aluminium alloy bars can be eliminated by sufficient cold drawing reduction before solid solution. The nucleation of recrystallization increases by certain cold drawing reduction. Cold drawing results in more homogeneous distribution of residual stress so that the elimination of coarse grain annulus and homogeneous fine grain structure can be achieved. The mechanism of the formation of the annulus in LY12CZ bars was discussed as well. It is concluded that the formation of the annulus can be essentially attributed to the violent shear deformation during hot extruding. Large shear strain brings large distortion energy to the outer layer of the products, thus facilitating the gathering of the particles containing manganese, and making them lose the retardation to recrystallization grain growth. Consequently, the nuclei formed by subgrain coalescence grow up accumulatively to form coarse recrystallization annulus during subsequent reheating and soaking processes before quenching.

**Key words** LY12 aluminium alloy coarse-grain recrystallization annulus cold drawing

## Structural Characterisation and Mechanical Properties of Nanocomposite Al-based Alloys

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Nanocomposite Al-based alloys can be obtained with a combination of amorphous, crystalline and quasicrystalline phases. In order to understand the correlation between the nanostructure and the mechanical behaviour, four nanocomposite alloys with different characteristics were studied: two alloys from the Al-Fe-Cr-Ti system consisting of a spherical nanoquasicrystalline phase in an  $\alpha$ -Al matrix; one alloy from the Al-Fe-V-Ti system consisting of a mixture of amorphous and  $\alpha$ -Al phases; and one alloy from the Al-Mn-Cr-Cu system consisting of nanocrystalline particles embedded in an  $\alpha$ -Al matrix. Melt-spun samples were prepared and the structure was characterised by means of X-ray diffraction and transmission electron microscopy. Differential scanning calorimetry was used to study the thermal stability and the transformation processes. Tensile tests, fractographic analysis and Vickers microhardness at room temperature were performed in order to evaluate the mechanical behaviour. A combination of solid solution, particle dispersion and grain refinement strengthening was responsible for the high strength of the alloys. The microstructure of the alloy Al<sub>93</sub>Fe<sub>3</sub>Cr<sub>2</sub>Ti<sub>2</sub> (at%) remained acceptably stable up to 703 K, due to the slow coarsening rate of the icosahedral phase.

# Strengthening Mechanisms in Al-Based and Zr-Based Amorphous Nanocomposites

Devitrified Al-based and Zr-based amorphous alloy nanocomposites with nanoscale precipitates of element, compound or quasicrystalline particles are regarded as new prospective structural materials with good mechanical properties. In order to analyse the strengthening behaviour of the partially devitrified amorphous nanocomposites, a phase mixture model is presented, in which the partially crystallised Al-based or the Zr-based amorphous alloys is regarded as a nanocomposite of nanoscale particles and the remaining amorphous matrix. Most attention is paid to the change of solute concentration in the matrix. The element, compound or quasicrystalline particles are treated as perfect materials. The matrices are treated as amorphous materials, in which the solute concentrations change depending on the solute concentration and volume fraction of precipitate particles. Investigating the solute concentration changes associated with overall mechanical properties could prove that the phase mixture model can successfully describe the strengthening mechanism in the devitrified Al-based and Zr-based amorphous nanocomposites.

## Texture and mechanical property anisotropy in an Al–Mg–Si–Cu alloy

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### Abstract

This work describes the correlation of microstructure–texture and texture–mechanical properties of a hot rolled Al–Mg–Si–Cu alloy in T-6 condition. Texture measurement was carried out on both the surfaces and mid thickness levels of the specimen using conventional pole figure as well as orientation distribution function (ODF) methods. Tensile properties and fracture toughness of the alloys were evaluated at different orientations with respect to the rolling directions. High cycle fatigue properties were evaluated in the rolling direction. From these observations, the in plane anisotropy factor (%IPA),  $K_{TQ}$  values and fatigue life were calculated and correlated with textures and microstructures/fracture features of the alloy. © 2000 Elsevier Science S.A. All rights reserved.

**Keywords:** Al–Mg–Si–Cu alloy; Microstructure; Texture; Mechanical property; Fatigue; Fracture toughness; Anisotropy

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# Evolution of microstructure during annealing of a severely deformed aluminum

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## Abstract

The annealing behavior of a severely plastically deformed (SPD) aluminum, which was produced by equal channel angular extrusion (ECAE), was studied in the present work. The SPD structure is quite stable at temperatures below 523 K. As the annealing temperature increases, the grain growth rate exhibits a discontinuous change in the range of 548–573 K. The activation energy at lower annealing temperatures (<548 K) is 49 kJ/mol, while at higher temperatures (>573 K); it is 85 kJ/mol, which is close to the value for grain boundary diffusion in aluminum. The microstructures after annealing have been characterized quantitatively by the parameters including grain shape, grain size distribution, boundary misorientation and global texture. It is suggested that the annealing behavior of this SPD aluminum may be described as a continuous process of (sub)grain coarsening, or continuous recrystallization.

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**Keywords:** Aluminum; Equal channel angular extrusion; Grain growth

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## 轧制镁合金超塑性和超塑胀形<sup>①</sup>

**摘 要:** 对轧制态 MB15 镁合金进行了超塑性拉伸实验, 结果表明: 晶粒尺寸为  $5.9\ \mu\text{m}$  的 MB15 镁合金板材, 在温度为 573 K、初始应变速率为  $5.56 \times 10^{-4}\ \text{s}^{-1}$  的变形条件下, 获得的最大延伸率为 309%, 应变速率敏感指数为 0.34; 当真应变为 0.3 时, 试样的晶粒尺寸为  $4.5\ \mu\text{m}$ , 说明在拉伸初始阶段轧制镁合金可以获得细晶组织, 同时发生了部分动态再结晶。利用扫描电镜观察断口发现典型的超塑性空洞形貌特征。通过胀形实验可以看出, 该镁合金板材的超塑成形性能好, 具有良好的超塑性成形应用潜力。

**关键词:** 超塑性; 动态再结晶; 气胀成形; 镁合金

## Superplasticity and superplastic bulging capability of rolled magnesium alloy

**Abstract:** Superplasticity of a rolled magnesium alloy Mg-Zn-Zr was investigated at 573 K and a strain rate of  $5.56 \times 10^{-4}\ \text{s}^{-1}$ . The maximum elongation is 309% and the strain rate sensitivity exponent  $m$  is 0.34. The grain size of the rolled magnesium alloy is  $5.9\ \mu\text{m}$ . However, the grain size of the specimen deformed to a true strain of 0.3 is  $4.5\ \mu\text{m}$ . The grain refinement is attributed to dynamically continuous recrystallization during the initial stage of tensile test. SEM observation shows that the typical cavities are obvious in fracture surfaces of tensile samples after superplastic deformation. Finally, the successful superplastic gas pressure bulging forming experiment proves the satisfying superplastic forming capability of the alloy.

**Key words:** superplasticity; dynamic recrystallization; gas pressure bulging; magnesium alloy



## 稀土铈对 AZ61 变形镁合金组织和力学性能的影响<sup>①</sup>

**摘 要:** 研究了不同稀土铈含量对 AZ61 合金显微组织和力学性能的影响。实验发现: 加入稀土铈后, AZ61 合金铸态组织的  $\beta$  相变少、变细, 铸态晶粒细化; 大部分铈与铝结合生成高熔点、高热稳定性的稀土相  $\text{Al}_4\text{Ce}$ ; 在热挤压和退火过程中,  $\text{Al}_4\text{Ce}$  能够阻碍晶粒或亚晶粒的长大, 使晶粒细化。适量的稀土铈提高了挤压态合金的强度、延伸率和显微硬度; 而过量的稀土铈则会导致 AZ61 合金的性能下降; 含 1.0% 稀土铈的挤压态合金可得到最高的抗拉强度 308.1 MPa、最高屈服强度 180.1 MPa、最大的显微硬度 HV80.5 和最高的延伸率 14.2%; 所有试验合金的断裂方式是解理断裂。

**关键词:** AZ61+Ce; 挤压; 显微组织; 力学性能

### Effect of Ce on microstructures and mechanical properties of AZ61 wrought magnesium

**Abstract:** Effects of Ce addition on the microstructures and mechanical properties of the AZ61 alloy have been investigated. It is found that Ce makes refinement of  $\text{Mg}_{17}\text{Al}_{12}$  and grains, and decreases the amount of  $\text{Mg}_{17}\text{Al}_{12}$  phase. Most of Ce reacts with aluminum to form compounds of  $\text{Al}_4\text{Ce}$  with high melting point and elevated temperature stability which retards grain growth during hot deformation. Certain amount of Ce increases tensile strength, yield strength, elongation and hardness. With more addition, Ce would combine more Al in matrix and decrease strengthening effect because  $\text{Al}_4\text{Ce}$  phase would become coarsening. The mechanical tests indicate that AZ61 has the best properties when the content of Ce is 1.0%. Maximum tensile strength, maximum yield strength and maximum elongation are 308.1 MPa, 180.1 MPa and 16.2%, respectively. The fracture mechanism of AZ61+Ce alloys is cleavage.

**Key words:** AZ61+Ce; extrusion; microstructures; mechanical properties

## Dispersion Strengthening in a Hypereutectic Al-Si Alloy Prepared by Extrusion of Rapidly Solidified Powder

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When a hypereutectic aluminum-silicon alloy containing 16 wt pct silicon was rapidly solidified into powder using the spinning water atomization process, the individual powder grains were predominantly aluminum that was supersaturated with silicon and also contained well-dispersed 0.02- $\mu\text{m}$  silicon particles. Although the silicon particles grew when the powder was extruded into a bar at temperatures from 673 to 803 K at an extrusion ratio of 4.3 and an extrusion speed of 0.9 mm/s, the average diameter was maintained on a submicron level. When the extrusion temperature was decreased from 803 to 673 K, the average diameter of the silicon particles in the extruded bar decreased from 0.8 to 0.5  $\mu\text{m}$ , while the Vickers hardness (HV) and the ultimate tensile strength of the extruded bar increased from 120 to 160 (HV) and from 330 to 500 MPa, respectively. Both the hardness and the tensile strength of the extruded bars were several times higher than those of conventionally cast bars of the same alloy with cooling rates from  $10^{-1}$  to  $10^2$  K/s. On the other hand, the elongation decreased from 5.5 to 3.1 pct when the extrusion temperature was decreased from 803 to 673 K.

# Fabrication of spray-formed hypereutectic Al–25Si alloy and its deformation behavior

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## Abstract

This article reports the fabrication of hypereutectic Al–25Si alloy, which is expected to be applied to the cylinder liner part of the engine block of an automobile due to its excellent wear resistance, low density and low thermal expansion coefficient, through a spray casting process and the characterization of the microstructural and the mechanical properties of this alloy. The OSPREY process used in this study is one of spray forming techniques, which can produce semi-finished products such as billet, tube, and plate with rapid solidification (RS) structure and density in a single operation from molten metal. The obtained microstructure of the hypereutectic Al–25Si alloy appeared to consist of Al matrix and equiaxed Si particles with average diameter of 5–7  $\mu\text{m}$ . To characterize the deformation behavior of this alloy, a series of load relaxation and compression tests have been conducted at temperatures ranging from RT to 500 °C. The strain rate sensitivity parameter ( $m$ ) of this alloy has been found to be very low ( $\leq 0.1$ ) below 300 °C and reached maximum value of about 0.2 at 500 °C. During the deformation above 300 °C in compression, remarkable strain softening has been observed. The extrusion has been successfully conducted at the temperatures of 300 °C and above with the ratio of area reduction of 28 and 40 in this study.

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*Keywords:* Spray forming; Hypereutectic Al–25Si alloy; Compression test; Load relaxation tests; Hot extrusion

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## Artificial aging and shear deformation behaviour of 6022 aluminium alloy

### Abstract

In this study, the artificial aging behaviour of 6022-T4 alloy is investigated over a wide temperature range. Hardness readings, TEM and XRD analyses were performed. It was shown that 6022-T4 alloy can be substantially hardened through a short aging treatment at temperatures in excess of 200 °C. The strain hardening curves of the 6022 alloy in different aging conditions were measured using the simple shear test and analysed in terms of their respective microstructures. The under-aged and pre-peak-aged exhibited a good combination of strength and strain hardening while the peak-aged alloy was characterised by maximum strength, albeit with a drastic reduction in strain hardening ability. Strain reversal experiments in simple shear were carried out in order to characterize the Bauschinger effect for the different heat treatment conditions. It was shown that the T4 and under-aged conditions lead to permanent softening of the flow stress.

*Keywords:* Aluminium; Aging; Hardness testing; TEM; Shear testing; Bauschinger effect

# 第4章 引言(前言)的写法

## 引言的重要性

引言是说明论文写作的背景、理由、主要研究成果及其与前人工作的关系等,目的是引导读者进入论文的主题,并让读者对论文中将要阐述的内容有心理准备。因此,引言有总揽全文的重要性,是论文中最难写的部分之一。

引言内容的安排可以有较大的伸缩性,但基本内容应该包括研究背景、存在问题 and 研究目的等三个方面,对于篇幅较长、结构复杂的论文,可简略说明研究的主要结论和论文的框架。

引言不同于正文,摘要。

正文是对所提出的问题的描述、分析、论证。

摘要重点是介绍本文的主要贡献,而没有更多的篇幅来系统地介绍本文的背景、与前人工作的联系、区别等。

在撰写引言时一定要考虑到它是独立于摘要和正文的章节,但是常常可以看到一些论文的引言,基本上是将摘要重复一遍,再加上一些文献综述,这是不大可取的写法。

引言既是科学论文中不可缺少的环节,也是一般科技文件,甚至信件、备忘录等也常用的类似的引导形式,用以简单介绍正文的主要观点。

## 第1节 引言的主要内容及写作要求

### 一、引言所包含的主要内容

- 介绍论文的目的、宗旨和中心议题      ➤综述前人在此领域内所做过的工作
- 介绍背景知识      ➤介绍论文的学术思想,论文的价值和意义
- 研究手段和方法      ➤介绍正文的框架结构

#### 1. 介绍问题的背景和他人的贡献

★从问题的工程背景与历史背景开始,简述问题的理论或实用意义及他人在该领域的工作,系统地列举有关参考文献,但这不是文献综述,只列举与本文最直接有关的几篇。

★问题的提出和方法的选取,往往是以他人工作为基础。如果引言中对问题背景介绍还不能达到说清楚问题的程度,通常是在正文中另辟一节详细说明。

★摘要中一般是简略地用一两句话概述问题的提出。引言中就必须交代清楚其来龙去脉,严格分清前人的成果与本文的工作,这是科学工作者的基本道德。学位论文与学术论文在这里稍有差别,由于篇幅与要求不同。学位论文的问题背景叙述可以详细一些。

#### 2. 研究范围、目的及贡献

在较为广泛的背景下,将本课题的任务具体化。说明所要完成的工作,也就是说在已有工作的基础上,有什么贡献,或者明确交代有那些创新。

切忌广告式用语,例如“首次发现”、“首次提出”等,更不宜妄自评价,或引用鉴定文件的评价用语,诸如“填补国内空白”、“达到国际先进水平”,等等。

#### 3. 主要研究方法

引言中有时需要介绍研究方法。一般分为两大类:本文引用前人提出的方法,即并无作者的贡献;已有方法的修正、推陈出新,或者是新的研究方法,即作者在方法上有所贡献。

第一类有必要在引言中明确交代其来源或根据。

第二类是研究工作的主要贡献,正文中的重点内容。因此,引言中必需明确指出,但不详述。

研究方法介绍在引言中并不占很大的篇幅。

### 二、学术论文与学位论文引言的差别

学位论文的引言除了与学术论文有相同的要求以外,显著差别之处是,在学位论文评审中还要考察作者在所研究领域掌握的基础理论和专门知识的深、广度。因此,它比学术论文相

应部分的篇幅要大一些,有关引用的参考文献应更为详细。以往学位论文较多地强调理论水平,但目前理论水平和技术成果被同样地重视,尤其重视其创造性,并且注意其科学意义和应用价值。

### 三、引言写作的基本要求

作为正文的开篇,引言的质量决定着读者对论文的第一印象。因此,在引言中如何表达作者的研究背景和目的,并引起读者的阅读兴趣就显得十分重要,级简介而清楚地解释:为什么要选择这个论题,这个论题为什么重要?

如果要探讨的问题不是合情合理、明白地提出读者就会对问题的解决方案失去兴趣。同样,如果表述冗长、重点不突出,就有可能使读者失去对论文亮点的印象。因此,引言的撰写应注意一些基本要求。

▶尽量准确、清楚且简介地指出所探讨问题的本质和范围,对研究背景的阐述做到简繁适度。由于阅读相应期刊的读者已具备相关的专业基础知识,因此,复述潜在读者早已明白的一般性知识不仅没有必要,而且使人厌烦。但过分简略必要的信息或介绍页容易令读者感到突兀。

▶在介绍背景和提出问题时,应引用最相关的文献以指引作者,优先选择引用的文献包括相关研究中的经典、重要和最具说服力的文献,力戒刻意回避引用最重要的相关文献,甚至是对作者研究具有某种“启示”性意义的文献,或者不恰当地大量引用作者本人的文献。

▶采取适当的方式强调作者在本次研究中最重要地发现或贡献,让读者顺着逻辑的演进阅读论文切忌故意制造悬念,以期望在论文的最后达到高潮(甚至将重要的发现在摘要中也忽略),实际上这种做法往往适得其反,因为读者小一定有耐心阅读冗长的文章,直至坚持到最后的重要部分。

▶解释或定义专门术语或缩写词,以帮助编辑、审稿人和读者阅读与理解。

▶适当地使用 I、We 或 Our,以明确地指示作者本人的工作。如:最好使用 We conducted this study to determine whether 而不使用 This study was conducted to determine whether...

▶叙述前人工作的欠缺以强调自己研究的创新时,应慎重且留有余地。可采用如下表达: To the author's knowledge...; There is little information available in literature about...; Until recently, there is some lack of knowledge about...

### 四、写作要点

#### ▶研究背景介绍

介绍研究背景的目的是说明论文的主题与较为广泛的研究领域有何关联,同时要提供足够的背景资料,以便让读者了解论文内容的重要性。因此,通常是先指出较宽泛范围的一般性事实,然后将重点逐渐转入与论文所探讨的问题有密切联系的主题。

▶为说明研究工作与过去研究的关系,背景介绍通常要进行文献回顾来讨论曾经发表的相关研究,以介绍相关领域的研究概况与进展。文献回顾的长度视文章类别与研究领域而定(通常至少 1~2 个段落)。如果研究主题为许多其他学者曾经探讨的问题,则可能有很多参考文献需要讨论;相反,如果作者只是讨论某位学者最近才提出的非常专业的问题,则可能只须讨论 1~2 篇文献即可。

#### ▶提出研究问题

通过介绍研究背景,指出有某个问题或现象仍值得进步研究,进而就把焦点转到要探讨的研究问题,指出问题并阐明研究动机,以便读者了解作者的研究活动和研究目的。指出存在问题的方法:

★以前的学者尚未研究或处理不够完善的重要课题;★过去的研究衍生出有待探讨的新问题;★以前学者曾提出两个以上互不相容的理论或观点,而且必须做进一步研究才能解决这些冲突;★过去的研究很自然可以扩展到新的题目或领域,或以前提出的方法或技术可以改善或扩展到新的应用范围。

►阐述研究目的：旨在将作者的研究任务具体化，并根据情况说明在已有工作的基础上有什么贡献和创新，但切忌评价式用语，如：首次发现、首次提出、达到国际先进水平，等等。

## 五、常用表达与时态运用

引言中时态运用规则：介绍已有的认识，叙述本人或他人近期的工作或认识时采用过去时。

### 1. 研究背景

►介绍一般性资料、现象或普遍事实时，句子的主要动词多使用一般现在时。例如：

Acid rain is a serious problem in many areas of Europe.

►引述其他学者过去的研究行为时通常采用一般过去时，并且常以 that 从句叙述被引作首的研究结果(从句中动词的时态因所表达资料的性质而定)。如：

Chen showed (found, reported, noted, observed, Suggested...) that the water boils at 100°C

►如果 that 从句中的资料不是很确定的研究结果(如建议、假设等)，则主句中的动词应使用 suggested 或 hypothesized 之类的臆测动词，从句中则使用 may+现在时。如：

Ross(1990) suggested (hypothesized, proposed, argued) that reducing the duration of school vacations may help children to retain more of what they learn in class.

►描述特定研究领域中最最近的某种趋势，或者强调表示某些最近发生的事件对现在的影响时，常采用现在完成时如：

★In recent years, a variety of standards have been proposed in the literature.

★Many(A number of, Several, Few) experiments (studies) have been conducted(performed on, published on) the prevalence of back pain in helicopter pilots.

★Several researchers (authors, investigators, writers) have studied (investigated, examined, explored, reported on, discussed, considered) the role of computers in classroom instruction.

★The problem of back pain in helicopter has been the subject of much research (the subject of few studies, the focus of a great deal of research) in recent years (in the last decade, since 1990).

★There has been much research(little research) on the prevalence of back pain in helicopter pilots and other aviators.

### 2. 存在的问题

►如果叙述的是普遍的事实就用现在时。如：

① Little is known about X.

② Little literature is available on X.

►如果描述过去已开始并持续到现在的趋势或事件，则使用现在完成时。如：

③ Few studies have been done on X.

④ Little attention has been devoted to X.

►提出问题的表达方式

★以 however, few, little, no 等表示过去研究的不足或目前仍缺少某些资料，并引出作者的研究问题。如：

⑤ However, few studies have been done on (published on) surface-residue loss.

⑥ However, no studies have investigated (no work has been done on) surface-residue loss.

★以 although, while 引导，或以 but, yet 转折的复合句来提出问题。如：

⑦ Although much research has been done on CO<sub>2</sub> levels in agricultural soils (Smith, 1990), little work has been done on CO<sub>2</sub> levels in forest soils.

⑧ CO<sub>2</sub> level in agricultural soils have been studied extensively, but little attention has been devoted to CO<sub>2</sub> levels in forest soils.

### 3. 研究目的

►用 paper, report, thesis 或 dissertation 等表示论文提供资料的行为，重点在于介绍新的技术或方法、分析某个问题或提出某个论证。由于论文提供资料的行为是不受时间影响的事实，所以常使用一般现在时。

⑨ The purpose (aim, objective) of this paper is to analyze the effect of X on Y.

⑩ This paper presents (reports, describes, discusses) the results of experiments in which X was

mixed with Y.

☞ In this paper, we propose a new algorithm for sorting X.

☞ In this paper, experimental results are presented to show that X.

➤由于所涉及的资料“将要”在论文中被提出果，因此有些作者也偏向使用将来时(句子中有 purpose, aim 和 objective 等名词时除外)

☞ This paper will propose (present, evaluate, discuss) a new method for analyzing X (a theory that attempts to explain X).

☞ In this paper, we will argue (attempt to show) that X is equivalent to Y.

☞ The aim of this paper is to ...

☞ The main purpose of the experiment reported here was to...

☞ The study was designed to evaluate...

☞ The primary focus of this paper is on...

☞ The aim of this investigation was to test...

➤在阐述作者本人研究日的的句了中应有类似 This paper, The experiment reported here 等词，以表示所涉置的内存是作者的工作，而不是指其他学者过去的研究。例如：

☞ In summary, previous methods ate all extremely inefficient. Hence a new approach is developed to process the data more efficiently 就容易使读者产生误解，其中的第二句应修改为：

☞ In this paper, a new approach will be developed to process the data more efficiently. 或

☞ This paper will present (presents)a new approach that process the data more efficiently.

➤有时作者在引言中还可较谦盘地或试探性地指出自己研究的价值，其中常用的助动词有 may, should, could 等。如：

☞ These findings may be useful to researchers attempting to increase employee productivity.

☞ Our results could be beneficial to educators attempting to design more effective language programs.

☞ This report presents experimental data on ozone decomposition that may be of importance in explaining the breakdown of atmospheric ozone.

➤对于结构比较复杂且篇幅较长的论文，可简单地描述论文的结构。如：

☞ The conclusions of the paper are stated in section 5. (现在时)

☞ Section 5 presents concluding remarks (现在时)

☞ Section 3 will describe simulations in which the proposed algorithm was tested using three data sets.(将来时)

☞ In Section 4, we will present experimental results that confirm the effectiveness of the proposed method. (将来时)

## 六、句型库

➤研究目的 (Purpose)

☞ This problem is concerned (deals, bears) (chiefly, largely, mainly) with...

☞ This is a problem relating to...

☞ Our work is devoted to...

☞ The primary goal of the present research is...

☞ The work presented in this paper focuses in...

☞ The chief aim of this study is...

☞ The laboratory study demonstrates (suggests, indicates, reveals, establishes)...

☞ Doing this work, we intend (hope, expect, attempt) to...

☞ Carry out (undertaking, initiating, performing) this study, we hope to...

☞ The work presented in this paper focuses on several aspects of...

- ☉ The principal purpose (objective, task ) of the present (further, preliminary) work is to investigate the features of (mechanisms involved in, effects produced by)...

➤背景及历史(Background and History)

- ☉ This problem was (first) advanced by...
- ☉ The problem under discussion was formulated (raised, posed, brought up, put forward) by...
- ☉ Since then the problem has attracted (fascinated) many scientists (workers in this field).
- ☉ This problem has been clarified (elucidated, solved)...
- ☉ The problem as can be seen (as is known) is (still) poorly (inadequately) understood.
- ☉ Compared with the current research, the previous work was in connection with...
- ☉ The work we are doing is closely related to the deliberations described in...
- ☉ The new findings from the experiment agree well with the results obtained in...
- ☉ Several (numerous, many, few) studies are made (carried out, performed) to elucidate the nature (understand the behavior, reveal the cause ) of...
- ☉ A study of the kind has (never) been made (until now, until a few years ago )

➤问题的难易程度

- ☉ It seems (exceedingly, enormously) difficult in obtain knowledge of the problem...
- ☉ It proves (quite, totally) impossible to try....
- ☉ It is rather difficult to solve the problem...
- ☉ The problem is rather involved...
- ☉ The problem involves (certain, tremendous) difficulties.
- ☉ It is easy to present (review, analyze, discuss) the problem in all its complexity (in every detail).
- ☉ It is no easy task to gain an insight into the intricate detail of...

➤问题的范围

- ☉ The main aspect (core, essence) of the problem is...
- ☉ Studies of these effects cover various aspects of...
- ☉ Our studies with this technique confine ...
- ☉ The problem is within the scope of...
- ☉ Our problem lies beyond the range of..

➤研究程度

研究程度描述的标准句型之一

研究程度		动词(现在完成时,被动语态)	主题
Much Little No A volume of	work research	has been carried out on has been done on has been performed on has been published regarding has been conducted on has been devoted to	fuzzy voltage stability analysis.
Much Little	attention	has been devoted to has been directed toward has been focused on	the heterogeneous distillation.
Many A number of Several Quite few	studies experiments	have been conducted on have been done regarding have been performed on have been published on	the effect of delamination in flat laminates.



研究程度描述的标准句型之二

主 题	动词(现在完成时、主动语态)	研究程度	时间(可有可无)
The documentary structure of source code	has been	the subject of much research	in recent years. in the last decade. since 1995.
The effect of density fluctuations on the changes of azimuth	have been	the subject of few studies  the focus of a great deal of research	
The documentary structure of source code	has drawn has attracted	much attention much interest little attention	in recent years. in the last decade. since 1995.
The effects of density fluctuations on the changes of azimuth	have drawn have attracted		

研究程度描述的标准句型之三

主 题	动词(现在完成时, 被动语态)及研究程度	时间(可有可无)
The documentary structure of source code	has been widely discussed has been extensively examined has been thoroughly investigated has seldom been discussed	since 1992. in the last decade. in recent years.
The effects of density fluctuations on the changes of azimuth	have been widely discussed have been extensively examined have been thoroughly investigated have seldom been discussed	since 1992. in the last decade. in recent years.

还可用 There has been... 和 There have been... 句型来指出对某个问题的研究程度。

- ④ There has been much research on the documentary structure of source code.
- ④ There has been little research on load margin and critical bus determination.
- ④ There have been many studies on the documentary structure of source code.
- ④ There have been few reports on load margin and critical bus determination.

➤多作者导向引述句型

多作者导向引述常用句型之一

多作者	动词(现在完成时, 主动语态)	主 题	参考引述
Many investigators Several researchers A number of authors Few writers	have studied have investigated have examined have explored have reported on have discussed have considered	the fast decoupled continuation power flows	(3,4,5,7).

多学者导向引述常用句型之二

主 题	动词(现在完成时, 被动语态)	多作者	参考引述
The effects of devices such as VDTs	have been studied have been investigated have been examined have been explored have been reported on have been discussed have been considered	by several authors  by a number of authors  by many investigators  by few writers	(Brown,1982; Forman,1986; McGee,1988).

多作者导向引述常用句型之三

多作者	动词(现在完成时, 主动语态)	That	研究结果	参考引述
Several researchers	have found have shown have reported have suggested	that	muscle aches and joint pain can be reduced by the use of adjustable workstation furniture	(Kleeman, 1988; Roberts, 1990; Paul, 1993).

### ➤主要作者导向引述句型

论文作者在资料导向引述、对研究程度的一般描述或多作者导向引述之后,通常需要用2~3个句子把焦点转到与自己研究有关的一些参考资料,以介绍并评论这些参考文献提出的研究成果。

引述这些参考文献的句子称为“作者导向引述”。在这种引述中,往往把某个学者的姓作为句子的主语。由于句中的内容是指文献作者过去的行为,所以句子的主要动词通常使用一般过去时态。被引述学者的研究结果,则在动词后面的名词从句中加以叙述。

作者导向引述常用句型之一

作者姓及文献年代	动词(一般过去时, 主动语态)	That	研究结果
Hedge (1982)	showed found reported noted suggested observed pointed out	that	the open office caused too many disturbances and distractions.

作者导向引述常用句型之二

作者及文献年代	动词(一般过去时, 主动语态)	主 题	第二句为作者导向引述
Lee (1999)	studied examined investigated explored considered	the effect of environmental conditions on frost formation.	He found that ...

## 第2节 从句中的动词时态

在作者导向引述和有些多作者导向引述的复合句子中, 主句描述被引述学者的研究活动, 从句叙述学者提出的资料或研究结果。主句中的动词通常使用一般过去时态, 而从句(主要是宾语从句)的时态应视句子表达的内容而定。

### ►从句中的资料为普遍有效事实

★若作者认为以 that 开头的宾语从句中所提出的资料是不受时间限制的普遍有效的事实, 而不是只在所引述的研究情况下才有效, 那么从句中应该采用一般现在时态。

宾语从句使用一般现在时态

作者及文献年代	动词(一般过去时)	That	研究结果(一般现在时)
Marks (1932)	showed	that	water boils at 100℃.
Gorden(2)	found reported noted observed suggested pointed out		the gravity of the largest moon affects the orbits of the other moons.

★当从句的内容是描述其他学者曾经提出的方法或技术时, 若该方法或技术已成为一种标准的方法或技术, 或者现在仍有人使用它, 则此从句中可用一般现在时态。而主句中用一般过去时态, 说明提出方法或技术是该学者过去的行为。

### 定语从句使用一般现在时态

作者及文献年代	动词(一般过去时)	宾语	定语从句(一般现在时)
Davis (1991)	developed described introduced	an algorithm a technique a method	that solves the problems quickly.
Rubinstein [4]	designed presented proposed		that produces more effective results.

#### ►从句中的资料仅在特定情况下才有效

假如论文作者认为所引述的某学者的研究结果只在特定的研究条件下有效,并不是不受时间影响的普遍事实,那么在从句中应使用一般过去时态。

### 宾语从句中使用一般过去时态

作者及文献年代	动词(一般过去时)	That	研究结果(一般过去时)
Smith [1999]	found suggested observed reported	that	the predicted concentrations were in reasonable agreement with the experimental data.
Ludwig (2)	indicated		all the osmotic water fluxes measured were still far too small for practical application in the production of energy.

#### ►从句中的资料只表示一种建议或假设

有时,论文作者所引述的资料在原来的参考文献中就只用探讨的语气来叙述,或者这些资料仅仅是一些建议或假设,而不是十分确定的研究结果。此时,主句中的动词需采用如 suggested 或 proposed 之类的推测动词,而从句中的动词通常使用 may 加动词原形。

### 表示建议或假设的宾语从句的时态

作者及文献年代	推测动词(一般过去时)	That	资料(may + 动词原形)
Merten (2000)	suggested hypothesized proposed argued	that	these contradictory examinations may result from differences in the column design, sparger configurations or measuring techniques.

#### ►对引述资料的评语

有的作者在回顾文献时,在描述某个学者的研究工作之后,还对研究做出评论。此时,在描述研究工作的句子中应使用一般过去时态。对于做出评论的句子,若评语是针对过去的行为或事件,则句子的动词应使用一般过去时态。若评语的内容是指不受时间影响或目前仍然有效的事实,则应该使用一般现在式。

- ② Rahil [15] proposed a model based on the Excluded Volume determined by Onsager[6]. With this model, the variations of porosity could be described according to the aspect ratio.

- ② Aziz(1985)took into account the effect of these thermal resistances. However, his analysis was restricted to the longitudinal fin of two specific profiles.
- ② John(1978) presented a method for solving problems of this form when  $x \leq 1.5$ . However, his method is not applicable to the general case.

### 第3节 论文目的和中心议题的表达方法

介绍作者本人的研究主题通常至少包含两个主要的步骤，即指出问题与阐明研究目的。

为了说明自己的研究动机，作者需指出过去相关研究中尚未处理或解决的问题，或所派生的新问题，使读者对作者的研究目的有一个认识基础。作者紧接着就可以阐述自己的研究目的或研究活动。

有的导论还会指出自己研究的结果有何理论价值或应用价值；而有的导论还会说明本研究论文的组织结构。这两点不是导论的必要内容，不少研究论文的导论中不出现这两个步骤。

#### 一、指出问题方法的表述

➤以前的学者处理得不够完善或尚未研究的重要题目。➤过去的研究所派生并值得探讨的新问题。➤以前的学者曾经提出两个或两个以上互不相容的观点或理论，为了解决这些互为差异的观点或理论之间的冲突，必须开展进一步的研究。➤过去的研究自然可以扩展到的新领域或新题目，或者以前曾提出的方法或技术可得到改善或延伸到新的应用范围。

指出问题的基本句型之一

转折副词	指出过去研究的不足	研究主题
However,	few studies have been done on few studies have reported on few studies have been published on few researchers have studied no studies have investigated little research has been devoted to little attention has been paid to little information has been published concerning no work has been done on little literature is available on there is little literature available on little is known about insufficient data are available on	the supercritical fluid extraction of oil from herbaceous substrates.

指出问题的基本句型之二

连接词	主题一的研究程度	主题二的研究程度
Although	much research has been devoted to A,	little research has been done on B.
While	much work has been done on A, many studies have been published concerning A, many researchers have investigated A, much literature is available on A,	little attention has been paid to B. little information is available on B. little work has been published on B. few researchers have studied B. few studies have investigated B.

## 注意事项

★正确使用时态。若叙述在过去已开始并持续到现在的事件或趋势，则需使用现在完成时。

★正确使用单复数形式。名词 study, paper, researcher 及 investigator 等是可数名词，可用 many, few 或 no 来修饰。这些复数名词之后的动词也应采用复数形式。名词 work, literature, research 及 attention 等都是不可数名词，因此只能写成单数形式并紧跟单数形式的动词，修饰词应使用 much, little 或 no，但也可以用 many literature works，因为这里的 work 是著作之意，具有复数形式。也有的著作认为可以使用 researches 这种复数形式表示学术研究。

## 二、关于研究目的的表达法

指出研究目的或宗旨时所用的基本结构：本文的目的(或宗旨)是...：

★The purpose (/objective /goal/ etc.) of this article (/paper) is to ...

★It is the purpose(/task/target/etc) of this study to ...

★The main goal of this paper is to study ...

### 举 例

★Our task in this article is to persuade our readers not only that there is a place in science for computational experiment, but also that it is important to be able to tackle such problems using parallel processing. 本文的任务是使读者不仅了解计算实验在科研中占有一席之地，而且要知道，重要的是能够用并行处理的方式解决这些问题。

★The main goal of this article is to study the role of the information structure constraints, given in Game(b) or Game(c), in the pursuit-evasion encounter. 本文的主要目标是研究在“追击逃避”对策的对局(b)和对局(c)中信息结构限制条件所起到的作用。

★The purpose of this article is to attempt to stimulate a new look at the problem.

本文旨在试图对这个问题建立一种新观念。

### 论文导向基本句型之一

论文导向(一般现在时)	研究目的或主题
The purpose of this paper is The aim of this report is The objective of the present paper is	to obtain quantitative about the particles size distribution. to model the dynamic behavior in the super-or near-critical CO <sub>2</sub> extraction.
The present paper reports This report presents This thesis describes This paper discusses	heat transfer enhancement of the herringbone-type micro-fin tube. the complexity of some decision and function computation problems involving counterfactual formulas.
This paper proposes This thesis describes This letter presents	a fossil-fuelled power plant simulator with an ITS. an intelligent tutoring systems (ITS) to enhance the capabilities of a power plant simulator.

## 论文导向基本句型之二

论文导向(一般将来时)	研究主题
This paper will propose	a new method for analyzing A.
This thesis will present	several approaches to improving A.
This paper will evaluate	a theory that attempts to explain A.
This paper will discuss	new equations for expressing A.
This paper will argue	that Chen's assumption is false.
This report will present evidence to show	that the conventional method causes errors in special cases.
This letter will present a proof	how these material variables affect
In this paper, we will argue	paste formation during mixing.
In this report, we will attempt to show	

### 三、关于研究意图的表达： 在本文中我们试图……

★In this paper we attempt (/intend/ hope/ desire/ etc.) to ...

★In this thesis we aim at examining...

★In this work we attempt to....

#### 举 例

○ *In this article we intend to review the evidence for the wide spread occurrence of budding growth in many bacterial genera and to discuss how the study of this phenomenon can contribute to our understanding of bacterial morphogenesis, growth and differentiation.* (斜体字部分意为:在本文中我们试图……)

【译文】本文意在许多菌种中广泛出现芽生现象的证据进行研究,并讨论对这一现象的研究将会如何有助于了解细菌的形态、生长规律和变异。

○ *In this thesis we aim at examining the evidence for the existence of this particular particle.* (斜体字部分意为:本文的目的在于审查……的证据)

【译文】本文的目的在于审查有关这种特殊粒子存在的证据。

○ *The purpose of this article is to explain the principles behind an attack-defense game and to decide what strategy will prove to be most acceptable in specific situations.* (斜体字部分意为:本文的目的是解释…… 和确定……)

【译文】本文的目的是解释攻防对策的原则,并确定在特定环境中什么是最为可行的策略。

### 四、关于议题的表述

#### 本文主要讨论……

★This review (/paper /essay /etc.) deals mainly with (discusses/ explores/ covers/ examine)…  
本文主要处理(讨论/探讨/涉及/审查/等)……

★This paper reviews the evidence about…

★In this paper, ...is advocated (discussed/ investigated/ considered/ studied/ dealt with/ analyzed/ etc.)…

★In the present work, ...has been studied on the basis of ...

#### 举 例



○ *This review deals mainly with* the occurrence of transfer cells in the female gametophyte and sporophyte of angiosperms. (斜体字部分意为: 本文主要讨论/处理……)

【译文】本文主要讨论在被子植物雌性配偶形体和芽胞体中发生的细胞转移现象。

○ *This paper will reveal why* that computer is called a parallel computer. (斜体字部分意为: 本文将揭示为何……)

【译文】本文将告诉你那台计算机何以被称作并行计算机。

○ *The structure of a steady or limiting shock wave, formed as a result of a steady or sufficiently prolonged action on the mixture, has been investigated.* (斜体字部分意为: 已对……的结构进行了研究)

【译文】研究了混合液体受到稳定或持续时间足够长的外界作用之后所形成的稳定或限制性振荡波的结构。

○ *The reflection of shock waves from a rigid wall has been considered on the basis of the shock-wave discontinuity equations.* (斜体字部分意为: 在……的基础上被研究)

【译文】在不连续性振荡波方程的基础上研究了坚壁对振荡波的反射问题。

## 五、关于重点内容的表述

★This paper is limited to the discussion of...

★The emphasis of this paper is put on...

★This review will concentrate on...

★It is ... that is worth discussing...

### 举 例

○ *This paper is limited to the discussion of* the structure and function of a hard disc in a computer. (斜体字部分意为: 本文仅限于讨论……)

【译文】本文仅限于讨论计算机硬盘的结构和作用。

○ *The emphasis of this paper is put on* the classification of these cells. (斜体字部分意为: 本文的重点是……)

【译文】本文的重点是对这些细胞进行分类。

○ *This review will concentrate on* the important stages immediately before and after fertilization. (斜体字部分意为: 这篇论文将集中讨论……)

【译文】本文将集中讨论在授粉前后的各个阶段。

○ *It is* the cause-and-effect relation between the food one takes in and his mental health *that is worth discussing.* (斜体字部分意为: 值得讨论的是……)

【译文】值得讨论的是一个人所摄取的食物与他的精神健康之间存在的因果关系。

## 第3节 关于课题的价值和意义表示法

在介绍了论文的目的与宗旨之后, 需要简介所研究课题的意义, 以便读者判断本文是否值得一读。

有的作者在绪论中说明从事某项课题研究的理由, 从而也就侧面证明了课题的价值。

若指出理论上的贡献, 则作者要写出自己的研究结果能协助某些领域中的研究者说明某种现象、解决某个理论问题或提供未来的研究方向。

若指出实际应用价值, 则作者需说明作者的研究结果能协助某个领域的专业人员解决某些应用上的问题或达到某些目标。

### 举 例

- Our results may help to clarify whether the design of decentralized PI control system based on Nyquist stability analysis is effective.
- The results of this study may help to explain how helpful the technique strategy can be in promoting the innovation culture in an organization.
- The results of this survey may add to the literature on the factors that motivate engineers to prefer to remain in the traditional career paths (managerial and technical paths).
- Further data of this kind are of importance for understanding how the behavior of individual team members can enhance or impede team performance.
- Experiment similar to those reported here should be conducted using a wider variety of working conditions.
- The methods reported here could be beneficial to research attempting to increase the performance of wettable filters.
- The results of this study may be of interest to managers and educators attempting to develop programming standards and may help to increase programmer productivity.
- The results obtained from this novel approach would provide better insight to planners and operators in the field of power engineering to handle the uncertainties affectively.
- The results reported here could be used for qualitative and quantitative nondestructive evaluations and also for computing the acoustic material signature of a composite medium with defects.

有时也可以把研究目的和意义放在一起写

- The objective of this study is to investigate the evaporative cooling effect of a roof lawn garden in order to understand and predict the transport of heat and moisture in the lawn.
- The objective of this study is to empirically analyze the energy balance of a natural urban vegetated area to understand the resulting thermal and moisture regime and contribute to the knowledge of the physical urban environment in a tropical city.
- The paper presents a diffuser modeling technique that may significantly increase the accuracy of the predicted results.

This report describes a new electro-hydraulic controlled high-

- pressure gas injection system that may be of importance in designing the internal engines with alternative fuels.

一般而言,科技论文的作者极少直接宣称自己的研究结果能完全解决某个问题,而习惯用谦虚的口吻或试探性的态度来指出自己研究的价值,即使作者对自己研究结果的价值很肯定的时候,通常也只会表示这些结果能帮助大家解决某个问题或能提出一种可能的答案。细心的读者可能在参考本节的例句时,已发现可以用动词 may、could 等来表述论文作者的这种谦虚态度。

## ►常用语气词及其含义

- ① will 表示论文作者丝毫不怀疑句子的内容,确定程度最高。如:

The results of this experiment will provide further data conserving the performance of the novel heat pipe/ejectors cooler.

- ② would 在某些条件下很确定,即只要条件被满足,确定性很高。如:

If a mathematical model for a flat plate heat pipe for a start-up operation was developed, the transient heat transfer across the heat pipe walls and wicks and the temperature distributions in the heat pipe would be predicted.

- ③ should 确定性较高,但是不能完全确定。如:

The modification should improve the performance of the product, but it has not yet been tested in practice.

- ④ may 句子所表达的事情有可能发生,但作者不确定是否发生。如:

The results of this study may be useful to researchers attempting to gain more understanding of the behavior of the osmotic flow.

- ⑤ might 句子所表达的事情有可能发生,但比较不确定。如:

These data might help to clarify whether the steady state assumption is valid.

- ⑥ could 作者更不确定句子所表达的事情是否会发生。如:

Our findings could be beneficial to researchers in better understanding the adverse health effects of long-term exposure to whole body vibration.

## ►原因表示法

(某课题)起人们兴趣的原因是.....

★...is interesting (/important /valuable /explorable /etc.) from the viewpoint that...

从...观点看, ...是令人感兴趣的(/重要的/有价值的/值得探索的)..

★It is worth dwelling on... since... 值得详细探讨..., 因为

## 举例

○ Solar energy is valuable from the viewpoint that it may be the only one source of energy which does not lead to environmental pollution. (斜体字部分意为:……之所以有价值,是因为……)

【译文】太阳能之所以有价值,是因为它可能是唯一不污染环境的能源。

○ In fact, because it would be impossible to actually fail a million-dollar project just for the estimation of the consequences of such failures, the engineers have always found it convenient to utilize computers to imitate such consequences. (斜体字部分意为:事实上,由于……的原因,……一向认为……是颇为方便的)

【译文】事实上,由于不可能仅仅为了估计某个价值百万美元的工程项目万一失败会造成什么样的后果就实际上让这个项目失败,工程师们一向认为利用计算机模拟这样的后果是一个颇为方便的办法。

### ►研究价值(/重要性/优越性)的表述方法: ...的价值(/重要性/优越性等)在于...

The value(/importance/significance/advantage) of this paper(/research...) resides in...

本课题的价值(重要性/意义/优越性)在于...

○ The value of our research resides in its sociological influences. (斜体字部分意为:该研究课题的价值在于……)

【译文】该研究课题的价值在于它所产生的社会影响。

○ The significance of this study can be expressed in terms of the following. (斜体字部分意为:该课题的意义可以……方式来表示)

【译文】该课题的意义可以用下述方式来表示。

### ►关于研究工作的用途和必要性的表述

- ★... is used to (/as/for)... ...被用于...
- ★... can be applied to.. ...应用于...
- ★To... one need... 为了...需要...
- ★To... it is necessary to... 为了...有必要..

#### 举 例

○ Computers are used for the quick calculation of complicated math problems. (斜体字部分意为:被用于……)

【译文】计算机被用于进行复杂数学问题的快速计算。

○ To estimate the efficiency of this new method, one needs a theory describing the relationship between the time and materials consumed and the end results achieved. (斜体字部分意为:为了能够估计……的效率,需要……)

【译文】为能够估计这个新方法的效率,就需要有一种理论能够描述所消耗的时间和物资与所取得的最终结果之间所存在的关系。

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## 第4节 关于前人工作和研究成果的表述

在交代前人工作的同时也就交待了该课题的来龙去脉, 便于读者理解正文所论述的内容。

在进行综述时, 必须准确列出这些学者和研究人员的名字及有关论文或著作的名称(如论文末尾的参考数目中已经详细列出这些内容, 则可在括号中给出序号)和发表这些成果的日期, 简要介绍其成果和观点, 并可对其工作加以简短的评论。

### 一、三种典型的段落

#### 1. 最先从事研究的学者及其工作

○ Aggarwal and Leitmann (Refs. 12 and 13) *were perhaps the first to study the avoidance problem. They used a Chebyshev-type performance index as a measure of the degree of success in evasion (Ref. 13). Chebyshev-type criteria have also been used by other investigators in problems of optimal control (for example, Refs. 14—16) and differential games (Ref. 17).*

【译文】阿加瓦尔和雷特曼(参考资料12和13)可能是最先研究规避问题的人了。他们利用切比谢夫操作指数来衡量规避的成功度(参考资料13)。切比谢夫标准也被其他研究人员用来研究最佳控制问题(例如:参考资料14—16)和差分对策问题(参考资料17)。

#### 2. 按时间顺序介绍某研究工作的发展状况

○ *The early work on the stability of helium II was done with rotating cylinder viscometers for the same reason that early work on the classical problem was with viscometers; there was a need to clarify the nature of friction in the fluids under study, and to establish values of viscosity. A departure of the transmitted torque from its linear relationship with the angular velocity of one or other cylinder is taken as an indication of the onset of instability. The very first experiments of Mallock (1888, 1889) and Couette (1890) showed that in classical fluids there is a substantial difference in stability between rotating the inner or outer cylinder, with the latter arrangement being much more stable. We shall see that experiments by Donnelly (1959) and Heikkilä & Hollis Hallert (1955) reveal that the extra stability off low with the outer cylinder rotating found in the classical flow is not realized in helium II, and that the underlying mechanism for this instability needs to be understood. Other studies in helium II have been undertaken using second-sound absorption, which is a powerful tool for the detection of quantized vortices.*

#### 3. 先概括, 后分述

先概括某一研究工作总的发展状况, 再分述各个阶段(或各个学者)的工作。

○ *Research on calendar change has been very limited. Most studies have dealt with the number of institutions adopting new calendars or ad hoc committee case studies. Those studies that addressed financial issues only considered the costs associated with routine administrative functions. Calendar change has not been a typical. Smith (1975) reported that... Rosselot et al. (1978) reported that...*

Individual preference for one calendar type is another factor that compounds the issue. Smith (1975) revealed in a study completed at San Diego Community College that... Rosselot et al. (1978) found that...

A national calendar change study by Walz (1973) identified those factors that influenced calendar preference. They found that... Johnson et al. (1973) pointed out that... Walz (1973) reported that...



## 二、基本表达方式

### 1. 最先从事研究的学者

最先研究(调查/提出)...问题的是...

★...were/was perhaps the first to study (/investigate /look into /research on /raise the question of/etc.)... 首先研究(调查/研究/提出...问题/等等)...的也许是...

★The earliest work on...was done by... 在...方面最早的研究工作是由...做的。

#### 举 例

○ Chebyshev *was perhaps the first to study the problem of* performance index. (斜体字部分意为:.....可能是最早研究.....问题的人了)

【译文】切比谢夫可能是最早从事操作指数研究工作的人了。

○ *The earliest work on the problem of* performance index *was done by* Chebyshev. (斜体字部分意为:在.....方面最早的研究工作是由.....做的)

【译文】在操作指数方面最早的研究工作是由切比谢夫做的。

○ *The very first experiment on the stability of* helium *was performed by* Mallock. (斜体字部分意为:在.....方面最早的实验是.....做的)

【译文】在氦 I 稳定性方面最早的实验是马洛克做的。

○ *The first scientist to have described the law of* gravity *in a scientific way was* Newton. (斜体字部分意为:最早描述.....的科学家是.....)

【译文】第一个用科学方法描述重力法则的科学家是牛顿。

### 2. 前人的看法与观点

提出一般性认识、假设、观点和看法的句型:关于.....的普通假设(观点/看法/等)是...

★The common assumption (idea /opinion/etc.) about ... is that...

关于...的普通假设(观点/看法/等)是...

★It is commonly accepted (recognized/ believed/ etc.) that... 人们共同接受的观点是...

★For the past ...years...have been considered...在过去 ... 年里 ... 一直被认为是 ...

#### 举 例

○ *The common assumption about* bacterial growth *is that* reproduction occurs by binary fission to produce two identical daughter cells. (斜体字部分意为:关于..... 的共同假设是.....)

【译文】通常关于细菌生长的假设是:当细胞分裂成两个完全相同的子细胞时,便发生了细菌的繁殖。

○ *People usually assume(suppose/ presume/etc) that* migrants tend to be taller than non-migrants. (斜体字部分意为:人们通常以为.....)

【译文】人们通常以为,经常移居者的身高有高于从不移居者的趋势。

○ *It is commonly accepted(recognized/ believed/etc) that* reproduction occurs by binary fission to produce two identical daughter cells. (斜体字部分意为:人们所共同接受的观点是.....)

【译文】人们所共同接受的观点是,当细胞分裂成两个完全相同的子细胞时,便产生了细菌的繁殖。

### 3. 目前的新看法与观点

It is now recognized (determined/accepted /found/etc.) that...

现在人们已经承认(确认/接受/发现/等)...



○ *It is now recognized that there are a number of bacterial species in which growth occurs by the insertion of new wall material at one (or occasionally two) distinct regions of the cell.* (斜体字部分意为:现在人们已经承认……)

【译文】现在人们已承认,有一些菌种的生长是通过在其细胞的一个(有时是两个)独立区域中插入新细胞壁材料的方式实现的。

#### 4. 目前的发展状况

目前(近年来/现在/等)的...是...

★The leading...in the field of...is (are) now...现在在...领域里领先的...是...

★The design of...is now becoming a major enterprise...对...的设计目前正在成为主流...

*The leading computers in the field of large-scale calculation are now not exactly serial, but have been designed for work on sets of numbers which have to be treated in the same way, called vectors.* (斜体字部分意为:现在在……领域内领先的……是……)

【译文】目前在大规模计算领域里的领先机型准确地说并不是串行的,而是被设计成能够处理那些必须按同一种方式处理的数字集合的计算机。这些数字集合被称为向量。

#### 5. 研究所用的工具、手段和方法

(某研究工作)是用...做的

★... was used(employed/adoped/took/etc.) as a measure of...

★ They used(employed/adoped/took/etc.) ... as a measure of...

○ *They used the metric system as a measure of the distance covered within certain period of time spent.* (斜体字部分意为:他们以……作为……的测量尺度)

【译文】他们以公制作为特定时间内通过的距离的测量尺度。

○ *They employed a Chebyshev-type performance index as a means of measuring the degree of success in evasion.* (斜体字部分意为:他们利用……作为测量……的手段。)

【译文】他们利用切比谢夫操作指数作为测量规避成功度的手段。

#### 6. 研究和实验结果

(某研究或实验)表明(揭示/证明/等)...

★The very first (earliest / initial / etc.) experiment of...showed / indicated/ demonstrated/ proved/ revealed/ etc.) that... 最早的(某种)实验表明(显示出/证明/揭示出/等等)...

★... revealed that... ...证明...

举 例

○ *The very first experiment of his design showed that, with some modification, the hypothesis may turn out to be practical.* (斜体字部分意为:……的首次实验表明……)

【译文】根据他的设计所做的首次实验表明,略加修改之后,这个设想可能会被证明为现实。

○ *It was revealed by the very first experiment of Mallcock (1888, 1895) and Couette (1890) that in classical fluids there is a substantial difference in stability between rotating the inner or outer cylinder, with the latter arrangement being much more stable.* (斜体字部分意为:……的首次实验揭示出……)

【译文】玛洛克(1888,1895)和库埃特(1890)最早做的实验表明,在普通液体中旋转内圆柱和外圆柱时,两者之间在稳定性上有很大的不同,后者的稳定性要好得多。

#### 7. 课题的最终成果及其特点

➤关于研究成果的表述:后来产生了(出现了/导致了/等).....

★Further advances have been made so that... 进一步的发展产生了.....

★This sequence of...eventually produced resulted in... 一系列的...产生了

★The eventual products of this series of...are... 这一系列的最终产品是...

举 例

○ *This sequence of advancing technologies finally resulted in the production of the like of hand calculators of which the central processing unit was so cheap that it could be made far more complex and still be inexpensive.* (斜体字部分意为: 这个系列的……最后导致……的产生)

○ *Later on, hand calculators came into being.* (斜体字部分意为: 后来, 出现了……)

【译文】后来, 出现了袖珍计算器。

►关于特点问题的表述: ……的特点是……

★... is characterized by..., ...的特点是...

★...is different from...with respect of..., ...在...方面与...有所区别

★...stands out among..., in that(because/for reasons that/etc.)..., ...优于..., 因为...

★... is known for its..., ...因...而出名

举 例

○ *Modern scientific research is characterized by the diminishing division of work between physical and chemical scientists at the atomic levels.* (斜体字部分意为: ……的特点是……)

【译文】现代科学研究的特点是, 物理学家和化学家在原子水平上的分工越来越模糊。

○ *The new method is different from the old ones with respect of the criteria adopted for data evaluation.* (斜体字部分意为: ……在……方面与……有所区别)

【译文】新方法在数据评估的标准方面与旧方法有所区别。

○ *What is special about the new theory is that it ignores all the peripheral considerations and comes right into the core.* (斜体字部分意为: ……的特殊之处在于……)

【译文】新理论的特殊之处在于它摒弃了所有的外围因素, 直截了当地解决核心问题。

►与其它成果间的不同之处: ……与……不同

★... is distinct (different) from...

★There is a difference between... and...

★... different from ... in that ...

○ *It is fundamentally distinct from the more commonly studied growth pattern seen in E. coli.* (斜体字部分意为: 它与……之间有着根本的不同)

【译文】它与得到更为普遍研究的 E. coli 的生长方式有着根本的不同。

○ *It is completely different from the more commonly studied growth pattern seen in E. coli.* (斜体字部分意为: 它与……之间有着根本的不同)

【译文】(同上)

○ *There is a great difference between budding and the more commonly studied growth pattern seen in E. coli.* (斜体字部分意为: 在……和……之间存在着根本的不同)

►与其它成果间的相同之处: ……与……相同

★... is apparently similar to (identical to/ near to/etc.) ...与...明显相似(相同/相近/等)

★...share a common pattern of..., ...享有共同的...模式

★... is equivalent to..., ...与...相等

★... is the same as..., ...与...相等

8.有待解决的问题: 有待解决的问题...

★New problems have to be solved: how..., how...

必须解决新的问题：如何...,如何...?

★The problems that... face seem to be..., ...面临的问题似乎是...

★The remaining problems seem to..., 遗留的问题似乎是...

★Problems in this field yet to be solved are...,

这个领域里仍有待解决的问题是...

## 第5节 论文组织结构的介绍

有些论文的前言还会介绍整个研究论文的组织结构，它位于前言的结尾处。

工科领域中的研究论文有各种形式的组织结构，所以有些论文作者和有些期刊的编辑觉得这类研究论文的导论需要加一个段落以描述论文的结构。建议论文作者参阅自己拟投专业期刊上发表的一些论文，以确定自己论文的导论中是否应包含这一部分。

### 介绍论文结构的句型

- The organization of the paper is as follows.
- This paper is organized as follows.
- The structure of the paper is as follows.
- The paper is organized into the following sections.
- The organization of the rest of the paper is as follows.
- The remainder of this paper is organized as follows.

In Section 2, we present a general derivation of the method for a generic CSP, based on information analysis.

Section 4 contains a description of the numerical explorations and the test beds, as well as a presentation and a discussion of the results.

The relevant procedure and theoretical analysis are presented in detail in Section 2.

Finally, related work is summarized in Section 5, while conclusions and work-in-progress are reported in Section 6.

In Section 2, a nonlinear theoretical approach that can provide a clear dynamical insight of how nonlinearity plays a role in such a flow system is presented.

这种不自然的句子应该改写为：

In Section 2, a nonlinear theoretical approach is presented that can provide a clear dynamical insight of how nonlinearity plays a role in such a flow system.

或

Section 2 presents a nonlinear theoretical approach that can provide a clear dynamical insight of how nonlinearity plays a role in such a flow system.

## 第 5 节 实例分析

### A COMPARATIVE OF TWO Al-Mg-Si ALLOYS FOR AUTOMOTIVE APPLICATIONS

#### Introduction

In search for lighter cars, the automotive industry shows a considerable interest in the application of aluminium sheets for car body panels. The basic requirement for those sheets is to have a high formability, so that the panels can be stamped, while retaining or preferably increasing their strength when the part is painted and baked. The heat treatable Al-Mg-Si alloys of the 6xxx series are often used. They have a very good formability, corrosion resistance, spot weldability and additionally show a precipitate strengthening after the paint-bake cycle (1).

The relationship between the  $Mg_2Si$  precipitates and the mechanical properties of these alloys is well established. Coherent needle-shaped  $\beta''$ -  $Mg_2Si$  precipitates which play a key role in the strengthening mechanism evolve from the solid solution during the baking treatment. According to Lorimer (2) the precipitation sequence in Al-Mg-Si alloys is as follows:

supersaturated  $\alpha \rightarrow$  clusters  $\rightarrow$  needle-shaped GPZ ( $b''$ )  $\rightarrow$  rods ( $b'$ )  $\rightarrow$  equilibrium  $Mg_2Si$  plates.

The formability and strength of aluminium alloys is inferior compared with steel. This necessitates to acquire a better understanding of the link between processing, microstructure and mechanical properties of these alloys. The present work is a comparative study of two Al-Mg-Si alloys which differ in the level of Si. The influence of ageing, deformation and a second solution treatment on the mechanical properties has been studied. The associated microstructures, evaluated by means of transmission electron microscopy (TEM) and X-ray microanalysis (EDS), have been used to explain the observed properties.

### GRAIN BOUNDARY STRENGTHENING IN A FINE GRAINED ALUMINIUM ALLOY

The dependence of strength on the grain size of metals has received a great deal of attention since the early work of Hall [1] and Petch [2]. The general form of their relationship is given by:

$$\sigma = \sigma_0 + Kd^{-n} \quad (1)$$

where  $\sigma$  is the strength,  $\sigma_0$  frictional stress,  $d$  the grain size,  $K$  a constant and  $n=1/2$ . Two models have evolved for explaining the dependence of resistance to plastic deformation on grain size and both models could be used to derive the above equation. The first model is based on the concept that grain boundaries act as barriers to dislocation motion [3], while the second one concentrates on the influence of grain size on dislocation density, and hence on the yield or flow stress [4].



## 第5章 实验方法(Experimental)

### 一、作用

这部分要作者回答的问题是：自己做了些什么？自己又是如何做的？它的作用，一是让那些同领域的研究者在必要时也能重复和验证作者的研究方法，二是证明作者所采用的方法是经过认真仔细的考虑的，能被认可的正确方法。

科学研究的基本要求是**研究结果能够被重复**，而快速判定结果能否被重复的途径就是作者所描述的材料与方法。因此，当论文提交给同行评议时，审稿人通常会十分关注并仔细阅读“材料与方法”部分。如果评审人对作者是否采取了正确可行的研究万法或技术、或实验能否被重复高度怀疑，就会建议退稿，而不管研究结果是如何的激动人心。因此，材料与方法的表达至关重要。

### 二、基本内容

📖 对于所采用的材料、仪器仪表、设备及测试系统所作的详细介绍

📖 对于实验程序所作的清楚说明

若有必要，基本内容还可以包含以下资料：

📖 对整个实验的概述

📖 选用特定材料、设备或方法的理由。

📖 实验的特殊条件或工况，如特殊的温度、速度或压力范围，特殊的高电压或大电流等。

📖 特殊实验设备或方法的详细介绍。若采用的是标准的实验设备或方法，则作简略介绍。

📖 应用的统计、分析方法的描述。

### 三、写作要点

通常按照实验进行的先后顺序来排列所介绍的内容。先对整个实验作简单概述(包括实验目的)，并叙述该实验的研究对象、样本或材料；然后介绍测试仪器仪表及测试系统(可用附图)；接着描述实验步骤；最后指出实验结果的收集方式和分析结果的方法。

在某些研究领域，作者会把实验及方法部分的内容分成几个小节，每个小节专门介绍基本内容中的一个项目。

#### 1. 对材料的描述应清楚、准确

通常先对材料做概述，然后再详细描述材料的结构、主要成分或重要特性、设备的功能等。

材料描述中应该清楚地指出**研究的对象(样品或产品)的数量、来源和准备方法**。如果采用具商标名的仪器、化学试剂或药品时，还应包括对仪器进行精确的技术说明，并列出试剂或药品的主要化学和物理性质；有时甚至要说明仪器和样品制造商的名称及所在地。

对于实验材料、试剂，应采用国际同行所熟悉的通用名，尽量避免使用只有作者的、本国同行才知道的专门名称。

#### 2. 对实验方法的描述要详略得当、重点突出

通常按研究步骤的**时间顺序**描述方法，其内容包括：实验环境或条件(如温度、电压、辐射、特殊的光线等)；研究对象选择的方法；选用特定材料、设备或方法的理由；实验程序；所应用的统计分析方法，等等。如果没有时间顺序，就按**重要性程度**描述实验步骤。

在实验方法的描述中应给出足够的细节信息以便**让同行能够重复实验**，避免混入有关结果或发现方面的内容。必要时，应该完整地描述选择某种特定方法的理由。

如果方法新颖、且不曾发表过，应提供所有必需的细节；如果所采用的方法已经公开报道过，则引用相关的文献即可(如果报道该方法期刊的影响力很有限，可稍加详细描述)。

采用了统计分析方法对实验数据进行分析时，该方法应该是作者新近设计或获得的新方法，并且作者相信读者需要这种解释。如果采用的是普通的统计方法，则无需评论或解释。先进的或不常见的统计方法需要适当引用文献。

如果要描述的内容较多，可按层次使用子标题，并尽可能创建与结论中内容对应的子标题，这种写法可保持文章内部的一致呼应，并且读者也可很快了解某种特定方法和与其相关的结

果。

#### 四、语态和时态的运用

1.若描述的 内容为不受时间影响的事实，采用一般现在时。如：

A twin-lens reflex camera is actually a combination of two separate camera boxes .

2.若描述的 内容为特定、过去的行为或事件，则采用过去时。如：

The work was carried out on the imperial college gas atomizer, which has been described in detail elsewhere[4,5].

#### 举例

For experiments under conditions similar to those in a real engine, a rapid compression machine (RCM) was developed.

This real scale RCM with bore of 78.3 mm is based on a new driving concept. It offers optical access to the piston bowl from four directions, as shown in Fig 3. The RCM simulates one compression stroke of an engine with a speed of up to 3000 rpm.

#### 举例

The experiments were performed on two different NMR spectrometers. Samples S03, S04, S06, and S10 were tested on a Bruker Avance DMX 200 NMR spectrometer, operating at 200-MHz proton resonance frequency using a 10-mm<sup>13</sup>C-NMR broadband probehead without proton decoupling. The bandwidth was set to 100 kHz using an acquisition time of 0.041s. The applied 90° pulse length was 8.0μs. The dead time was 7.14μs. The total number of transients (radiofrequency [RF] pulses) was first set to 1024 for samples S04, S06, and S10 and 3072 for samples S03 to compensate for the lower content of ethanol.... The spin-lattice relaxation time, T<sub>1</sub>, was measured in each sample using a simple inversion recovery (180°-τ-90°) pulse sequence. The longer T<sub>1</sub> of 189 ms was measured in sample S10, which contained the larger pore volume.

The repetition time between RF pulses was set to 1 s....

3.材料与方法章节的重点在于描述实验中所进行的每个步骤以及所采用的材料，由于所涉及的行为与材料是讨论的重点，而且读者已知道进行这些行为和采用这些材料的人就是作者自己，因而一般都习惯采用被动语态。 如：

优：The samples were immersed in an ultrasonic bath for 3 minutes in acetone followed by 10 minutes in distilled water.

劣：We immersed the samples in an ultrasonic bath for 3 minutes in acetone followed by 10 minutes in distilled water.

4.如果涉及表达作者的观点或看法，则应采用主动语态或不定式结构。 如：

优：For the second trial, the apparatus was covered by a sheet of plastic. We believed this modification would reduce the amount of scattering.

优：For the second trial, the apparatus was covered by a sheet of plastic to reduce the amount of scattering.

劣：For the second trial, the apparatus was covered by a sheet of plastic. It was believed this modification would reduce the amount of scattering.



## 五、句型库

### 1. 方法介绍

#### ➤ 引用已有的方法

- ★ The method of... was first developed by...    ★ The method of... came into use as long ago as...
- ★ The original proposal of this method was first published in...

#### ➤ 提出新方法

- ★ The method we use differs (greatly, essentially) from the conventional one.
- ★ The newly - elaborated technique is different from the one previously used.
- ★ The method is now greatly improved...

#### ➤ 引用已有的方法

- ★ The procedure we followed has certain advantages over the existing method.
- ★ One of the assets of this technique is its simplicity (reliability, sensitivity).
- ★ Another good feature of this method is...    ★ This method allows us to demonstrate...
- ★ The above procedure makes it possible to evaluate...
- ★ This method is capable of providing...

### 2. 实验描述

#### ➤ 实验目的描述

★ We made (carried out, performed, initiated) this experiment to show (demonstrate, elucidate, evaluate) a correlation between (certain phenomena, the mechanism of, the hypothesis of, some features of)...

★ Experiments on... are made (underway) to...

★ Earlier (previous) experiments with this technique were intended (designed, designated) to...

#### ➤ 实验目的描述

★ The experiments reported here demonstrate a variety of changes in (a correlation between, a much resistance to)...

★ Our experiment supports our assumption (evidence, hypothesis) that...

★ Recent experiments with.. furnish some new information (further data, new evidence) about the mechanism (the influence) of...

★ Further experiments in this area lead us to conclude (believe, suggest) that...

★ From these experiments we can conclude that...

### 3. 理论说明

- Our theory is based on the assumption that...
- This theory proceeds from the idea (principle) of...
- The underlying concept of the theory is as follows.
- There is a similar (a tentative, an alternative) theory that...
- The basic (fundamental, essential) feature of this theory is...
- The object of this theory is to...
- The newly - advanced theory has some (certain, many) advantages (assets, strong points, positive features, strong points, deficiencies, drawbacks, inadequacies, flaws, shortcomings).
- The validity of the theory has become obvious in the light of recent findings.
- This newly - developed theory finds experimental support...
- The theory received universal recognition (general acceptance).

#### 4. 公式推导

... is given by:  
... as follows:  
... as in the following:  
... the following equation is obtained  
... this becomes  
Therefore, we have  
... can be expressed as  
... can be derived:  
... can be written:  
... can be described by...  
... can be represented as

#### 举 例

### Enhanced mechanical properties of an Al based metal matrix composite prepared using mechanical alloying

## 2. Experimental procedures(实验过程)

### 2.1. Materials preparation

The nominal composition of the MMC is Al-4.5wt.%Cu-10vol.%SiC particulates. Half of the Al was first MAed with all the Cu and SiC particulates in a Fritsch Pulverisette 5 planetary ball mill using 40 hardened steel balls of 16 g each. The ratio of ball to powder weight was controlled at 16:1. The rotational speed of the turn table of the ball mill was controlled at 200 rpm. The relative rotational speed ratio of the vial was 2.17. The vial was filled with Ar before the MA process.

To prevent excessive cold welding during the alloying process, ethylacetate ( $\text{CH}_3\text{CO}_2\text{C}_2\text{H}_5$ ) was applied as a process control agent (PCA). The MAed powders were later cold compacted with the half of Al to green compacts of 35 mm diameter and about 40 mm long. The green compacts were sintered at  $600^\circ\text{C}$  for 2 h followed by extrusion at  $570^\circ\text{C}$  with an extrusion ratio of 13. Dry graphite was used in the extrusion process as the lubricant. The extruded specimens were solutionized at  $520^\circ\text{C}$  for 4h followed by quenching. Artificial ageing was finally carried out at  $170^\circ\text{C}$  for different durations to obtain peak ageing.

### 2.3. Characterization

A Shimadzu X-ray diffractometer, operated at 30 kV and 20 mA, was used to evaluate the structural changes of the MAed powder as well as the extruded specimens. A Reomatrix 1500 differential scanning calorimeter (DSC) was employed to study the thermal behaviour of the MAed powders. The heating rate was controlled at 10° C/min. The microstructure and fractography analyses were performed using a JEOL JSM-T330A scanning electron microscope (SEM) at an accelerating voltage of 15 kV.

### **A two-step processing route for achieving a super plastic forming capability in dilute magnesium alloys**

## **2. Experimental material and procedures**

Third, some of the rods prepared by casting and extrusion were cut into lengths of 60 mm and subjected to ECAP for one pass at 573 K using the same pressing conditions as documented earlier. These samples are henceforth designated “cast + extrude” “ECAP”.

Following each of these three processing routes, samples were prepared for examination by transmission electron microscopy (TEM) by cutting disks from the rods with diameters of 3 mm and thicknesses of 0.1 mm, grinding on successively finer

papers and then thinning to perforation at room temperature using a twin-jet electropolishing facility with a solution of 15% HClO<sub>4</sub>, 15% C<sub>3</sub>H<sub>8</sub>O<sub>3</sub> and 70% C<sub>2</sub>H<sub>5</sub>OH. Additional thinning was also conducted using ion milling in an argon environment. All samples were examined using an Hitachi H-8100 transmission electron microscope operating at 200 kV. For the samples subjected to ECAP, the TEM observations were made on the Y or flow plane where this is parallel to the side face of the sample at the point of exit from the die [18].

To evaluate the potential for achieving superplastic elongations in the Mg–0.6%Zr alloy after these three processing routes, tensile specimens were machined from the rods with the gauge lengths lying parallel to the longitudinal axes of the samples. These specimens had gauge lengths of 5 mm and cross-sectional areas of 2.3 mm<sup>2</sup>. All specimens were tested in tension at a temperature of 573 K using a testing machine operating at a constant rate of cross-head displacement and with initial strain rates in the range from  $3.3 \times 10^{-4}$  to  $3.3 \times 10^{-1} \text{ s}^{-1}$ .

## **Fabrication of spray-formed hypereutectic Al–25Si alloy and its deformation behavior**

### **2. Experimental procedure**

The composition of the present alloy was Al–25Si. A 15 kg alloy-preform was prepared via the OSPREY spray casting process with the melt temperature of 850°C. A schematic drawing of the apparatus used in this study is given in Fig. 1.

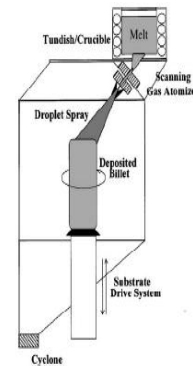


Fig. 1. A schematic drawing of the spray casting apparatus used in this study.

The alloy was first melted in a graphite crucible using an induction-heating furnace with a thermocouple placed at the bottom of tundish to monitor the melt temperature. The melt stream was then atomized into fine droplets by nitrogen gas at a high pressure, which were deposited onto a substrate positioned at an appropriate distance from the tundish nozzle.

The diameter of the billet thus obtained was 180 mm. After measuring the density distribution of billet, specimens for compression test, load relaxation test, and extrusion were taken from the center part of the billet, having over 97% of the ideal density. The gauge dimensions of specimens were 4mm×4mm×6mm for compression tests and 3mm×4mm×27mm for load relaxation tests. For extrusion, billets of 80 mm in diameter were machined.

precipitates are generally beneficial in retaining extremely small grain sizes. By contrast, attempts to achieve ultrafine grain sizes with pure Mg or dilute magnesium alloys have been unsuccessful. It was shown earlier that the application of ECAP to pure Mg at 673 K was not effective in reducing the grain size below  $\sim 100\text{ }\mu\text{m}$  and the grain size attained in an Mg–0.9%Al solid solution alloy was  $\sim 17\text{ }\mu\text{m}$  after ECAP through two passes at 473 K [8].

These relatively large grain sizes are in sharp contrast with the ultrafine grain sizes achieved by ECAP processing in fcc materials where, typically, the grain sizes are in the range of  $\sim 0.2\text{--}1.3\text{ }\mu\text{m}$  [9,10]. Accordingly, the present investigation was undertaken specifically to evaluate the potential for using ECAP to attain an ultrafine grain size and superplastic ductilities in a dilute Mg alloy.

## **Amorphous and nanostructured Al–Fe–Nd powders obtained by gas atomization**

### **2. Experimental procedure**

Atomization of the Al<sub>90</sub>Fe<sub>5</sub>Nd<sub>5</sub> alloy was carried out in a confined nozzle atomizer. The composition is expressed in atomic percent. Pure Nd and an Al–Fe master alloy were induction heated at 1300°C in a helium atmosphere using a graphite crucible coated with BN. The melt was teemed through the nozzle exit and atomized by a concentric jet of He at 2.4 MPa.

The Al<sub>90</sub>Fe<sub>5</sub>Nd<sub>5</sub> powder was allowed to cool down to room temperature in the inert gas atmosphere of the atomizer. Afterwards, it was collected in air and sieved three times to achieve separation into four size ranges: <25, 25–50, 50–100 and 100–200 $\mu\text{m}$ .

The amorphous and crystalline structure, morphology and microstructure of the Al90Fe5Nd5 particles as a function of size range were investigated by X-ray diffraction (XRD) using Cu–K radiation, scanning electron microscopy (SEM) equipped with an X-ray energy dispersive analysis unit (EDX) and transmission electron microscopy (TEM).

For preparation of TEM samples from the 25 m size range, particles were mixed with resin and put into a 3 mm diameter copper tube. From the cured bars, discs were cut and mechanically ground to a thickness of about 100 $\mu$ m. Finally, the discs were ion milled. The thermal stability of the powder was studied by differential scanning calorimetry (DSC) at a heating rate of 20°C/min in a dynamic argon atmosphere. The calorimeter was also used to perform heat treatments at up to 250, 400 and 600° C at the same heating rate.

For preparation of TEM samples from the 25 m size range, particles were mixed with resin and put into a 3 mm diameter copper tube. From the cured bars, discs were cut and mechanically ground to a thickness of about 100 $\mu$ m. Finally, the discs were ion milled. The thermal stability of the powder was studied by differential scanning calorimetry (DSC) at a heating rate of 20°C/min in a dynamic argon atmosphere. The calorimeter was also used to perform heat treatments at up to 250, 400 and 600° C at the same heating rate.

## **Effect of precipitates on microstructural evolution of 7050 Al alloy sheet during equal channel angular rolling**

### **2. Experimental procedures**

For sample preparation, a commercial 7050 Al alloy was first hot rolled at 476 8C to 1.0 mm thickness and then annealed at 476 8C for 2 h followed by furnace cooling (FC) to room temperature. The chemical composition of the 7050 Al alloy was determined by wet chemical analysis and is shown in Table 1.



The annealed sheet with a dimension of 70 (w)/1.0 (t)/300 (l) mm<sup>3</sup> was ECA rolled at room temperature for total 6 passes through a channel (Fig. 1) that had an oblique angle 120°( $\phi$ ) and a curvature angle 0°( $\psi$ ) to give a shear strain of ~1.0 on each pass. Between the second and the third pass, the sheet was heat-treated at 250°C for 30 min followed by air cooling to room temperature.

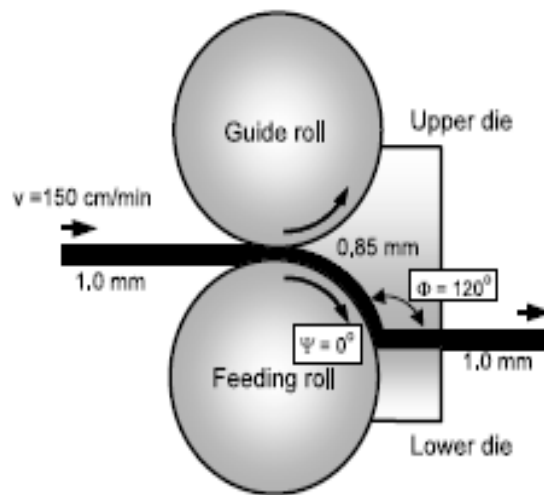


Fig. 1. A schematic illustration of ECAR equipment.

This intermediate heat-treatment was applied because no more than three repetitive passes of ECAR was possible for one sample without the heat treatment due to development of many side and surface cracks in the sample. As to ECAR route, feeding direction was unchanged between adjacent 2 passes of ECAR as usually referred to route A [3/5,9].

The microstructural change with increasing number of ECAR passes was examined using a transmission electron microscope (TEM) equipped with energy dispersive X-ray (EDX) analyzer. The thin foils for TEM observation were prepared by twinjet electropolishing in a 30 % Nital solution (methanol 700 ml/nitric acid 300 ml). Lastly, Vickers microhardness (Hv) of each sample corresponding to each number of passes was measured by imposing a load of 300 g for 10 s.

## **Amorphous and nanostructured Al–Fe–Nd powders obtained by gas atomization**

### **2. Experimental procedure**

Atomization of the Al<sub>90</sub>Fe<sub>5</sub>Nd<sub>5</sub> alloy was carried out in a confined nozzle atomizer. The composition is expressed in atomic percent. Pure Nd and an Al–Fe master alloy were induction heated at 1300°C in a helium atmosphere using a graphite crucible coated with BN. The melt was teemed through the nozzle exit and atomized by a concentric jet of He at 2.4 MPa. The Al<sub>90</sub>Fe<sub>5</sub>Nd<sub>5</sub> powder was allowed to cool down to room temperature in the inert gas atmosphere of the atomizer. Afterwards, it was collected in air and sieved three times to achieve separation into four size ranges: <25, 25–50, 50–100 and 100–200 μm.

The amorphous and crystalline structure, morphology and microstructure of the  $\text{Al}_{90}\text{Fe}_5\text{Nd}_5$  particles as a function of size range were investigated by X-ray diffraction (XRD) using Cu-K radiation, scanning electron microscopy (SEM) equipped with an X-ray energy dispersive analysis unit (EDX) and transmission electron microscopy (TEM).

For preparation of TEM samples from the 25  $\mu\text{m}$  size range, particles were mixed with resin and put into a 3 mm diameter copper tube.

From the cured bars, discs were cut and mechanically ground to a thickness of about 100  $\mu\text{m}$ . Finally, the discs were ion milled. The thermal stability of the powder was studied by differential scanning calorimetry (DSC) at a heating rate of 20°C /min in a dynamic argon atmosphere. The calorimeter was also used to perform heat treatments at up to 250, 400 and 600°C at the same heating rate. The amorphous volume fraction was obtained through a comparison of the energy released during the crystallization of the partial amorphous atomized powders with the energy released during the crystallization of full amorphous, melt-spun ribbon of the same composition and crystallization sequence.

## **Deep drawability of type 5083 Al-Mg alloy sheet under various conditions of temperature and forming speed**

### **2. Experimental**

An Al-Mg alloy sheet (JIS-A5083P-O in Japanese standard) of 1 mm thickness was used for the experiments. The chemical composition of the sheet is as given in Table 1.

#### **2.1. Uniaxial tension test**

Uniaxial tension tests were performed using type JIS-13B specimens (60×12.5 mm in the parallel portion) at a wide range of strain rates from static to dynamic deformation conditions ( $5.56 \times 10^{-5}$ ,  $5.56 \times 10^{-4}$ ,  $5.56 \times 10^{-3}$  and  $5.56 \times 10^{-2} \text{ s}^{-1}$  in an Instron-type (screw-driven) machine;  $5.28 \times 10^{-1} \text{ s}^{-1}$  in fly wheel-driven machine; and  $52.9 \text{ s}^{-1}$  in a drop-hammer-type testing machine). The testing temperatures were 293, 353, 423, 473 and 523 K.

The volume fraction and equivalent maximum diameter of featureless particles were measured by image analysis on representative SEM micrographs. To explore the mechanical properties of the powder and the capacity to be consolidated, Vickers microhardness was measured on polished particle cross-sections by applying loads of 10 and 25 g for 15 s.

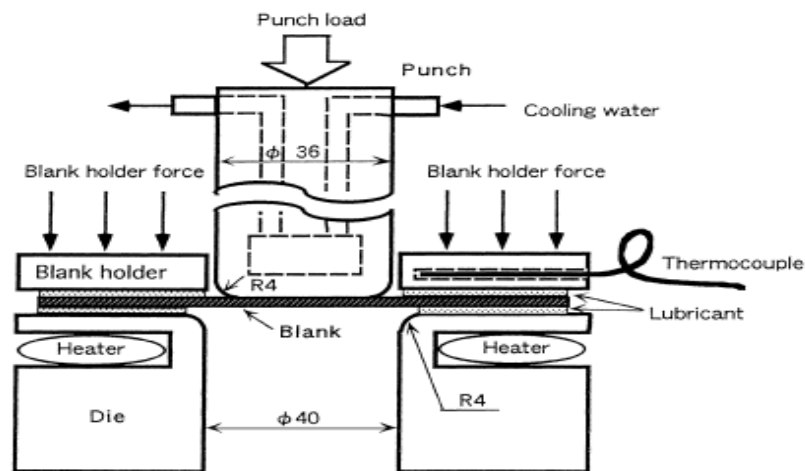


Fig. 1. Schematic diagram of the apparatus for the deep drawing tests.

Cylindrical deep drawing tests were performed at various punch speeds (0.2–500 mm/min) in an Instron-type (screw-driven) machine, at temperatures of 298, 353, 423 and 453 K. The punch was water-cooled during the hot working tests. The blanks surface and the punch head were cleaned before each test. They were carefully wiped clean of oil using acetone, whilst the contact surfaces of the blanks, of the die and of the blank holder were coated with a wax type lubricant. The initial blank-holder force was determined as a minimum force that can prevent the wrinkling of the blanks. The blank-holder force varied during the experiment, because this device was of the type that enabled the clearance between the die and the blank to be kept constant.

## Hardness behavior of the partially crystallized amorphous $\text{Al}_{86}\text{Ni}_9\text{Mm}_5$ alloys

### 2. Experimental

$\text{Al}_{86}\text{Ni}_9\text{Mm}_5$  (Mm: misch metal) master alloy was prepared by arc melting under argon atmosphere, and melt-spun into amorphous ribbon under vacuum by remelting the alloy ingot in a quartz crucible and injecting it through a 0.6 mm nozzle onto a rotating copper wheel. The wheel velocity was  $42\text{ ms}^{-1}$  and the overall pressing injection was 0.5 atm. The resultant ribbons had a thickness of 20–30  $\mu\text{m}$  and width of 2 mm.

The crystallization reaction was measured using a differential scanning calorimeter (DSC) under a dynamic Ar atmosphere at heating rate of  $20\text{ }^{\circ}\text{C min}^{-1}$ . Continuous heating scans were used to estimate the volume fraction of fcc-Al crystalline formed in heated ribbons. According to the DSC result, the as melt-spun ribbons were heat treated in the DSC crucible from 150 to  $400^{\circ}\text{C}$  for 1–120 min.

The crystal structure and microstructure of the annealed specimens were examined by a combination of XRD and TEM. XRD traces were obtained using monochromatic Cu-K radiation over  $2\theta$  range of  $20\text{--}80^{\circ}$  at power of 5 kW in a Philips 1729 X-ray diffractometer. Transmission electron microscopy (TEM: Philips CM 200, 200 kV) was used to verify the amorphous state and to study the microstructure of partially crystallized ribbons. TEM specimens were prepared by electro jet polishing technique at 243K in 10% perchloric acid + 90% ethanol solution.

Micro-Vickers hardness of the melt-spun ribbons before and after heat treatments was measured using a SHIMADZU Vickers indenter with a 10 g load. The specimen was polished in plane sections of the chilled surface of as-melt-spun and heated ribbons. All ribbons were tested for ductility by a simple  $180^{\circ}$  bending test and checked for brittle fracture.

As-melt-spun amorphous ribbons exhibited good bend ductility and could be bent through  $180^{\circ}$  without fracture.

# 第 6 章 实验结果的表述

## 一、重要性

实验结果是作者研究成果的集中反映，是整篇论文的立足点，因此也可以说是论文中最重要的部分。论文的前部分(引言、研究方法)是为了解释为什么和如何获得这些结果，后部分(分析讨论部分)则是为了解释这些结果的内涵。

## 二、结果的主要内容

- 结果的介绍：指出结果在哪些图表中列出
- 结果的描述：描述重要的实验或观察结果
- 对结果的评论：对结果的说明、解释，建立模型，提出机理，与他人的研究结果进行比较等。

## 三、结论或讨论的内容

结论并不是结果的简单重复，从结果出发可以按如下几方面去提炼出结论：

- 结果与基本原理的联系与推广
- 结果及其解释与前人工作的比较
- 工作的理论意义与可能的实际应用或应用前景
- 结论可能的局限性，可简要提出下一步的工作

## 四、写作要点

- 对实验或观察结果的表达要高度概括和提炼

不能简单地将实验数据或观察事实堆积到论文中，必须要突出有科学意义和具代表性的数据和结论，不能没完没了地重复一般性数据。对于特别重要的结果应采用原始数据。对于一般性数据的表达则可采用总结数据(如平均值和正负标准偏差)或转换数据(如百分数)的形式。

- 数据表达可采用文字与图表相结合的形式

如果只有一个或很少的测定结果，在正文中用文字描述即可；如果数据较多，可采用图表形式来完整、详细地表述，文字部分则用来指出图表中资料的重要特性或趋势，切忌在文字中简单地重复图表中的数据，而忽略叙述其趋势、意义以及相关推论。

- 适当说明原始数据，以帮助读者理解

如果论文中还包括独立的 discussion 章节，应将对于研究结果的详细讨论留到该部分，但实验结果中应该提及必要的说明(或解释)，以便让读者能清楚地了解作者此次研究结果的意义或重要性。

明确地给出相关统计结果对于实验分析有时是十分重要的。通常需要提供的统计数据包括：标准偏差(standard deviation);均值的标准误差(standard error of the mean)等。

- 文字表达应准确、简洁、清楚

避免使用冗长的词汇或句子来介绍或解释图表。为简洁、清楚起见，避免把图表的序号作为段落的主题句，应在句子中指出图表所揭示的结论，并把图表的序号放入括号中。

### 举 例

劣: Figure 1 shows the relationship between A and B,

优: A was significantly higher than B at all time points checked (Fig. 1)

劣: It is clearly shown in Table 1 that nocillin inhibited the growth of *N. gonorrhoeae*.

优: Noeillin inhibited the growth of *N. gonorrhoeae* (Table 1).

表达“比较”时，避免使用 compared with，应直接明确指出比较的结果。如：

劣: X was significantly increased compared with Y (Fig. I)

优: X was significantly higher than Y (Fig. 1).

- 在避免冗长表达时注意不要犯有关先行词使用方面的错误，最常见的这类错误是滥用先行词 it。例如：

- ☉ The left leg became numb at times and she walked it off ... On her second day, the knee was better, and on the third day it had completely disappeared.(文中的 It 的先行词是 the numbness? 还是 a result of numbness? 指代不清。)

➤用文字叙述表格或图中的资料时,作者不必列出全部资料,而只需要提出这些资料所反映的重要事实。作者应该避免在文字叙述中表达与图表中提出的完全相同的内容,尤其是不能在文字叙述中重复图表中的所有资料。图表用于表示详细的、完整的结果,而文字叙述则用来提出图表中资料的重要特性或趋势。

➤文字叙述与图表用途虽然有别,但它们相辅相成,通常不能缺少其中的一种方式。在介绍研究结果时,作者应注意为读者解释自己的研究结果。不能光在图表中列出一大堆数据而需要读者自己耗费时间来解读这些资料。作者应该以文字叙述的方式直接告诉读者这些数据出现何种趋势、有什么意义,并清楚地陈述根据图表中的资料所能得出的推论和结论,以及说明这些资料如何能支持自己的推论。

➤如果研究论文有独立的讨论部分,那么对于研究结果的详细讨论应该留给讨论部分。然而,在结果部分中还是有必要对研究结果提供一些基本的解释,以便读者能清楚了解研究的结果。

如果作者觉得有必要说明自己的数据分析方法,那么在结果部分也可以作这些说明。

研究论文的图表中应包括足够的资料,以便让读者在未看文字叙述的情况下还能大致了解研究结果,尤其在学术会议上报告研究论文中将图表单独展示时更是如此。另外,图表应有清楚的标题与标记。

## 五、时态的使用

### 1.结果的介绍

指出结果在哪些图表中列出,常用一般现在时。

- The variation in the temperature of the samples over time is shown in Figure 2.

或:

- Figure 2 shows the variation in the temperature of the samples over time.
- As Figure 2 shows, the temperature increased rapidly. (或: The temperature increased rapidly, as shown in Figure 2.)
- The temperature increased rapidly (see Figure 2).

### 2.重要结果的描述

叙述或总结研究结果的内容为关于过去的事实,所以通常采用过去时。

有时也会使用现在时描述结果,其与使用过去时的差别是:使用现在时表示“该结果是在研究过程中所揭示的是普遍事实”。相反,使用一般过去时则表示“这是我们在本次研究中在某些特定情况下所发现的事实”。

### 3.对结果的评论或说明

- 对结果进行说明或由其得出一般性推论时多用现在时。

A possible explanation for this is that all of the oxygen was used up in the early stages of the reaction.

The higher incidence of back pain in civilian pilots **may be** due to their greater accumulated flying time.

It **appears** that because of their greater accumulated flying time, civilian pilots are subject to higher incidence of back pain.

- 不同结果之间或实验数据与理论模型之间进行比较时,多采用一般现在时(这种比较关系多为不受时间影响的逻辑上的事实)

These results **agree** well with the findings of Smith, et al.

The theoretical model **fits** the experimental data well.

The data **indicate** that the model is reliable and accurate.

- 当比较作者的技术或方法的性能与其他学者曾提出的技术或方法的性能时,可使用现在



时(暗示是普遍有效的推论)或者过去时(只有在特定的情况下才有效)

The values predicted by our model **have** a smaller degree of error than the values generated by Rickert's model do. (作者认为句子内容为普遍事实).

Our algorithm **required** consistently less processing time than Chen's algorithm. (作者只是指出在特定的实验中, 自己的算法比陈氏算法所用的时间少).

- 当评论的内容为据研究结果作出的推论时, 句子的主要动词通常使用一般现在时态, 且常用 appear、may、suggest、seem 等动词。
  - ★These findings suggest that the equivalence ratio is the strongest factor affecting the NO<sub>x</sub> emission levels through its influence on the combustion wave velocity and temperature.
  - ★The contact angles may have effect on the time required for the heat pipe to reach steady-state.
  - ★It appears that heat transfer coefficients are more dependent on heat flux in regions of lower quality ( $x < 0.5$ ).
- 当评论的内容为对研究结果可能的证明时, 句子的主要动词之前通常加上 may 或 can 这些一般现在时态的情态动词。
  - ★The layer structural or some other mixed complex material may be the most suitable refrigerants for the Ericsson magnetic refrigerator.
  - ★The results can be explained by a giant magnetic entropy change.
  - ★One reason of this advantage may be that the Hank visual programming language can avoid some of the syntactic problems associated with textual programming languages.
  - ★A possible explanation for this is that the Hank visual programming language can avoid some of the syntactic problems associated with textual programming languages.
  - ★This may have occurred because the calculation did not consider the initial cooling requirements to precool the semitrailer body and the solar radiation load.

说明结果时采用推测动词的句型

主语	一般现在时的推测动词	说 明
It	seems appears is likely is possible	that the Hank visual programming language can avoid some of the syntactic problems associated with textual programming languages.
These results These data	indicate suggest imply	

### 3.对结果的评论或说明

- 如果说明的具体内容出现在以 that 开头的名词性(主语, 表语, 宾语)从句或以 because 开始的原因状语从句中。根据情况的不同, 从句中的动词可能会使用一般现在时态、情态动词 may 加动词原形或一般过去时态。如果作者认为对结果的说明具有普遍有效性, 则在从句中使用一般现在时态; 若作者比较不确定此说明是否具有普遍有效性时, 则使用 **may+动词原形的形式**; 若作者认为说明的范围只限在自己研究的特定情况, 则使用一般过去时态。
  - ★It seems that ash deposition of coal P through thermophoresis.
  - ★It seems that ash deposition of Coal P may accelerate mainly through thermophoresis.
  - ★It seems that ash deposition of Coal P accelerated mainly through thermophoresis.

## 六、叙述研究结果的方法

科技论文中作者常常必须叙述的研究结果为：

- 📖 某个参数或变量在某段时间内的变化情况
- 📖 不同试样、方法或研究对象之间的比较
- 📖 不同参数或变量之间的关系或影响

表达参数或变量在某段时间内变化的基本句型

参数或变量	一般过去式动词	时间
The enhancement factor	increased decreased	when the applied voltage was from 0 kV to 20 kV.
The pressure	rose fell dropped	
The number of postgraduates in Management School	declined	from 1998 to 2000.
	went up	
	went down	
	remained constant remained unchanged	
The pressure	peaked	after 20 seconds.
The number of postgraduates in Management School	reached a maximum	in 2001.
	reached a minimum	

不同试样方法或研究对象之间比较的基本句型

项目 1	用于比较的动词短语	项目 2
The power throughput of the condenser	increased much slower than	that of the evaporator.
The NRP algorithm	has much higher packet dropping rate,	when compared to the PRP algorithm.
The PRP protocol	has a higher blocking probability	than the NRP algorithm.

表达不同参数或变量之间关系或影响的基本句型(简单句)

参数或变量 1	关 系	参数或变量 2
Pressure	was correlated with was negatively correlated with was dependent on was independent of was determined by was closely related to	the ambient temperature.

## 表达参量或变量之间关系影响的基本举行(复合句)

参数或变量 1	主句动词	连接词	参数或变量 2	从句动词
Pressure	increased	as	temperature	increased.
	decreased	when		decreased.
	rose			rose.
	fell			fell.

复合句也可改写为下列简单句：

- Pressure increased with an increase in temperature.
- Pressure increased with temperature.
- An increase in temperature led to an increase in pressure.

## 七、说明或评论研究结果

- 根据本人的研究结果作出推论

These results suggest that untrained octopuses can learn a task more quickly by observing the behavior of another octopus than by reward and punishment methods.

- 解释研究结果或说明产生研究结果的原因

These findings are understandable because the initial annealing temperature dictates the state of conformational structures.

- 把此次研究结果与其他研究结果作比较。例如提出自己的结果是否与其他研究者的结果一致。

These results agree with Gerner's analysis, in that  $Q_{max}$  varies inversely with length and to the third power of the pipe width.

- 把自己的研究方法或技术水平与其他成果进行比较。

The recognition rate of our system is significantly higher than that reported for Token's system.

- 作者指出自己的理论模型是否与实验数据符合。

The measured temperatures along the heat pipe were all highly consistent with the predictions of the theoretical model.

在评论或说明研究结果时，通常采用“个别评论”形式或“综合评论”形式。

“个别评论”是先介绍一个结果，并立即对这个结果加以评论，然后再介绍另一个结果并加以评论，接着再对第三个进行介绍并评论，……。当作者认为有必要对几个结果分别加以介绍评论时，这种形式适用。

## 举例 1

### Results

Figures 3 and 4 show the transient response of the power throughput and the temperatures for the disk-shaped heat pipe and the flat-plate heat pipe during the startup process, respectively. As shown in Figs. 3(a) and 4(a), the power throughput of the evaporator increases rapidly during the initial phase of the transient. Conversely, the power throughput of the condenser increases much slower and reaches the steady-state about 50s later than that of the evaporator. This is because the thermal capacity of the evaporator is smaller than that of the condenser due to the fact that the condenser area is seven times larger than the evaporator area for the disk-shaped heat pipe and nine times for the flat-plate heat pipe. . . .

The transient responses of the vapor temperature and the wall outer surface temperatures are shown in Fig. 3 (b) and Fig.4 (b). The temperature difference across evaporator wall and wick is larger than that across condenser wall and wick. This is because the heat flux in the evaporator is larger than that in the condenser due to the smaller evaporator area. . . .

The vapor and wall outer surface temperatures along the heat pipe at different times during the starting transient are shown in Fig.6 and Fig.7. For both disk-shaped and flat-plate

heat pipes, the bottom wick acts as a condenser. Therefore, the temperatures at the bottom wall outer surface are almost uniform. This indicates that neglecting heat conduction along the heat pipe is reasonable for the bottom wall and wick regions. . . .

## 举例 2

The results are shown in Figure 4. The two tests of quenching from 153°C have identical creep curves, confirming the thermoreversibility of quenching and aging as well as the reliability of the apparatus. The quench from 153°C to 0°C produced the least dense structure and the highest creep, whereas the quench from 96°C to 0°C yielded the most dense structure, leading to the slowest creep behavior. These results are understandable because the initial annealing temperature ( $T_0$ ) determines the state of conformational structures, from which the quenching takes place. For a higher  $T_0$ , greater excess free volume or molecular mobility is most likely to be frozen into the glassy matrix if quenching is performed properly. Thus molecular mobility is determined by the initial annealing temperature.

## 八、句型库

### 1. 结果的意义

- The results presented in this paper are (seem)...
- The findings reported here is (quite) striking (remarkable, fascinating).
- These preliminary findings are very reliable (encouraging, promising, convincing, ambiguous)
- The results reported here prove (confirm, support, bear out) the hypothesis, assumption, observation) that...
- These results shed (throw) some (new) light on the behavior (nature, role) of...
- The above findings can be viewed (approached) as follows (in terms of..., from another standpoint).
- We can consider (interpret, look at) these results as fully reliable (consistent with...).
- This fruitful work gives explanation to...

### 2. 由实验结果得出的结论

- Our findings suggests that...
- These findings lead the author to a conclusion that...
- Our data leave open the question of whether...
- In the future, we will extend the present studies to...
- Our work has contributed to the understanding of...
- The research work has brought about a discovery of...
- Further progress can be provided by this experiment.

## 九、实例

### Results

Table 1 shows that the measured drop  $\Delta T_{\text{exh}}$  caused in the temperature of exhaust gases between the inlet to the heat exchanger (evaporator of the heat pipe) and the exit from it is considerably more than what was predicted by modeling studies. Thus, referring to Table 1, it is observed that the  $\Delta T_{\text{exh}}$  values measured on the actual setup are consistently above the predicted values. This occurrence is especially striking at the tower inlet temperatures. These observations signal that the modeling was on the conservative side.

**Table 1. Temperature drop ( $\Delta T_{exh}$ ) of exhaust gases in the heat exchanger**

Inlet temperature	$\Delta T_{exh}$ (measured)	$\Delta T_{exh}$ (predicted)	Ratio of recovery( % )
Ambient temperature = 25°C			
378	154	131	71
361	140	117	70
212	106	53	93
274	46	12	88
Ambient temperature = 30°C			
206	38	9	83
312	142	80	93
476	231	212	73
Ambient temperature = 35°C			
155	30		not applicable
501	258	234	76

### Results

When a conventional heat sink is used on the cold side, the temperature of the cold junction drops rapidly until the maximum possible temperature difference across TEC is reached. When the PCM is used, most of the cooling energy is absorbed by the PCM, and therefore the cool side temperature drops more slowly than when PCM is not used, this is shown in Fig.9. With PCM, the temperature drops slowly at the beginning until the transient temperature is reached. During the phase change process, the temperature of the refrigeration system is almost constant until the phase change process is complete, as shown in Fig.9. This helps to keep the temperature difference across the TEC to minimum, thus improving its performance.

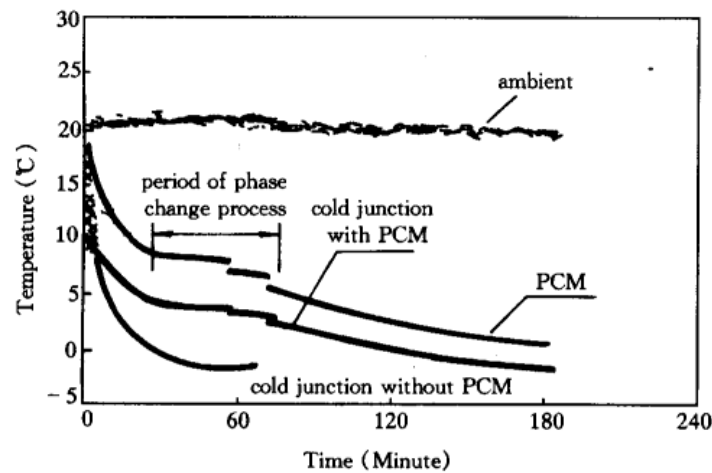


Fig.2 Variation of cold junction and PCM temperatures during the cooling process for the tests with, and without, PCM material.



# 第7章 分析讨论部分的写法

## 一、讨论部分的重要性

研究论文的讨论部分旨在阐明作者研究结果的意义。

在讨论部分中，作者需说明自己的结果和自己研究领域其他学者的研究之间的关系。与导论部分一道，作者需说明为什么自己的研究工作很重要，以及对本领域的研究做出什么样的贡献。例如：得到的结果能否支持或反驳重要的理论和假设，能否扩充或延伸此领域中的知识以及是否指出了新的研究题目或进一步研究的方向。

讨论部分可以使读者和专业期刊的审稿人从中看出作者研究工作的重要性与贡献：必须仔细而又充分地在讨论部分中表达自己研究结果的内涵，如果不重视这一点，至少会被学术期刊的编辑退回论文初稿。

为了让读者和专业期刊的审稿人易于了解研究论文的重要性，作者在讨论部分中应该回答部分或全部下面的问题：

- 作者所得到的研究结果是否符合自己原来的期望？如果不是，为什么不是？
- 根据这些结果，作者能做出什么样的结论或推论？如何解释这些推论？
- 作者的试验结果或理论分析结果是否和其他学者已提出的结果一致？如果不是，则能否说明不一致的原因？
- 是否能建议还有什么样的试验或理论分析方法可以让研究者来证实、反驳或扩延作者的研究结果？
- 这些结果能否支持或反驳作者领域中现有的理论？
- 根据这些结果，作者能否建议现有的理论应如何修正或扩充？
- 作者的结果是否有实际的应用价值？如果有，则有哪些应用价值？

## 二、分析讨论部分包含的主要内容

- 回顾研究的主要目的或假设，并探讨所得到的结果是否符合原来的期望？如果没有的话，为什么？
- 概述最重要的结果，并指出其能否支持先前的假设以及是否与其他学者的结果一致；如果不一致的话，为什么？
- 对结果提出说明、解释或猜测；根据这些结果，能得出何种结论或推论？
- 指出研究的局限性以及这些局限对研究结果的影响；并建议进一步的研究题目或方向
- 指出结果的理论意义（支持或反驳相关领域中现有的理论、对现有理论的修正）和实际应用

## 三、写作要点

### 1.对结果的解释要重点突出，简洁、清楚

- 讨论的重点要集中于作者的主要论点，尽量给出研究结果所能反映的原理、关系和普遍意义。
- 对于意外的重要的发现，也要在讨论中做适当解释或建议新的研究问题，但不能对其过于关注而迷失最初的研究问题。
- 讨论的内容应基于研究结果中的实验结果，不能出现新的有关结果方面的数据或发现。
- 为有效地回答所研究的问题，可适当简要地回顾研究目的并概括主要结果，但不能简单地罗列结果，因为这种结果的概括是为讨论服务的。

### 2.推论要符合逻辑，避免实验数据不足以支持的观点和结论

- 根据结果进行推理时要适度，论证时要注意结论和推理的逻辑性。在探讨实验结果或观察事实的相互关系和科学意义时，无需得出图去解释一切的巨大结论。
- 如果把数据外推到一个更大的、不恰当的结论，不仅无益于提高作者的科学贡献，甚至现有

的数据所支持的结论也会受到怀疑。

➤要如实指出实验数据的欠缺或相关推论和结论中的任何例外，绝不能编造或修改数据。

### 3.观点或结论的表述要清楚、明确

➤应尽可能清楚地指出作者的观点或结论，并解释其支持还是反对已有的认识。此外，要大胆地讨论工作的理论意义和可能的实际应用，清楚地告诉读者该项研究的新颖性和重要之处。

➤结束讨论时，避免使用诸如 **Future studies are needed** 之类苍白无力句字。

➤实际上许多读者首先阅读论文中“讨论”的结束部分，如作者在此不清楚地指出自己的重要结果和相关结论的科学意义，读者就有可能对论文的其他部分失去兴趣。

### 4. 对结果的科学意义和实际应用效果的表达要实事求是，适当地留有余地

➤避免使用 **For the first time** 等类似的优先权声明。

➤在讨论中应进择适当的词汇来区分推测与事实。例如，可选用 **Prove, Demonstrate** 等表示作者坚信观点的真实性；选用 **show, indicate, found** 等表示作者对问题的答案有些不确定性；选用 **imply, suggest** 等表示推测；或者选用情态动词 **can, will, should, probably, may, could, possibly** 等来表示论点的确定性程度。

## 四、讨论的表达与时态

### 1.回顾研究目的。通常使用过去时。如：

This research investigated the effects of two different learning methods.

In this study, the effects of two different learning methods were investigated.

### 2.概述重要结果

如果结论的有效性只是针对本次特定研究，需用过去式；如果具有普遍的意义，则用现在时。

★In the first series of trials, the experimental values were all lower than the theoretical predictions.

★Our findings are in substantial agreement with those of Smith(1985).

★The experimental and theoretical values for the yields agree well.

★These results contradict (are consistent with) the original hypothesis.

### 3.说明结果或阐述相关推论

➤描述研究结果时多采用主从复合句的形式，主句动词多为表示可能性的现在时动词，从句中的动词为现在时表示说明具普适性意义，从句中的动词若为过去时则说明的结果的范围只适于本次的特定情况。

★It is possible (may be, is likely)that adding water causes the reaction rate to increase.

★These results can be explained by assuming (This inconsistency indicates)that adding water caused the reaction rate to increase.

➤阐述由实验结果得出的推论时，通常使用现在时，因为得出的是具有普适性的结论或推论，而不只是在讨论自己的研究结果，并且结果与结论或推论之间的逻辑关系为不受时间影响的事实。

★The data reported here suggest (These findings support the hypothesis, Our data provide evidence) that the reaction rate may be determined by the amount of oxygen available.

★The reaction rate may be determined by the amount of oxygen available.

★The reaction rate is determined by the amount of oxygen available.

结论或推论的常用句型

主句(一般现在时)	That	推论或结论(一般现在时)
Our results indicate The data reported here suggest These findings confirm It appears Our conclusion is These results imply These data show These findings support the hypothesis Our data provide evidence	that	instructional design affects the outcome of education. (作者很确定结论或推论有效)  instructional design may affect the outcome of education. (作者不太确定结论或推论是否有效)

#### 4.说明研究方向或结果的限制

➤若指出作者已完成的研究工作的受限，则句子应该使用一般过去时。

★The number of tourists surveyed was quite small.

★Only three sets of samples were tested.

➤若作者需指出自己研究的方法、模型或分析的限制，则应该使用一般现在时态。

★The proposed model is based on three simplifying assumptions.

★Our analysis neglects several potentially important conditions.

★The method presented here is accurate, but cannot be implemented in real time applications.

➤如果作者想表述其他可能的条件与情况会对研究总结果可能产生的何种影响，则在句中应该使用一般现在时态，且在句中动词之前加上情态动词 may 或 might.

★Tests with other kinds of lubricates might yield different results.

★Our findings may be valid only for a wickless heat pipe.

★An experiment using different absorber plate material and thickness might produce different results.

➤有些作者会使用主语 We 以及 admit、recognize 之类的动词来直接表明自己研究方法的限制。

★We recognize that the method adopted in this paper does not incorporate traffic reshaping at intermediate nodes.

★We readily admit that a single short test may not fully reflect the performance of the new type compressor.

#### 5.指出实际应用或新的研究范围

➤在指出研究结果的实际应用时，应该使用一般现在时态，且在句子动词之前加上 may、might 或 should 等情态动词。若用 should，则表示作者对自己研究的应用价值相当肯定。

★Differences of these properties between liquid and vapor phase may be useful for various control means such as oil level or liquid level controls, measurements of oil contents.

★The results of this study may lead to the development of effective methods for measuring the air velocity in various shapes of ducts.

★The results of this research may help managers make more informed procurement decisions.

★The technique presented in this paper should be useful in producing ethanol from corn kernels.

➤当作者对进一步的研究方向或新的研究题目做出建议时，常可在句中使用一般现在时态，并在动词之前加上情态动词 would、could 或 should。若用 should，则表示比较强烈的建议。

★An important direction for further work might be to study the chunking process as it operates in programming tasks.

- ★It would be interesting to learn why oxygen is depleted during this type of sputtering.
- ★Another interesting topic would be to examine how learning outcomes are related to concept attainment.
- ★The generality of the gender moderated affect could be assessed in studies using other types of music and different exposure durations.
- ★Future research could explore the possibility to apply in chaos theory analysis.
- ★A further experiment should be conducted with a more sophisticated measuring system.
- ★A treatment of anthropogenic heat in the numerical model should be discussed in detail in the future.
- ★Future research should focus on doubling or tripling the conversion efficiency of commercial plants, reducing costs further, and resolving issues related to biomass residual ash.
- 在提出自己的建议时，有时作者可以直接用第一人称复数代词 we 作为主语，并用 suggest 或 recommend 当作主句的动词(动词仍用一般现在时态)。但在动词 suggest, recommend 后为表达建议内容的宾语从句中，必须用动词原形。
- ★We suggest that similar studies be conducted with other algorithms, such as GA.
- ★We recommend that these experiments be repeated using a wider range of working conditions
- 作者会在讨论或结论中提到自己正在进行或打算开展的相关研究时，句子可以使用现在进行时态或一般将来时态，最好用 we 作为句子主语，以强调这些正在进行打算开展的研究是作者本身的行为，否则读者通常会不清楚这些行为的主体是谁。
- ★The present authors are currently conducting experiments on a dry-expansion evaporator.
- ★In the future, we will investigate the effect of using fuel cells for both transportation and electricity applications.
- ★We are now conducting the numerical simulations of temperature distribution of all the surfaces of two urban blocks.

## 6.提出建议

- 建议新的研究课题或进一步研究的方向时，常使用现在时动词，有时在动词前加语态动词 would, could 或表示更强烈建议的 should.
- ★We suggest(recommend) that these experiments be repeated using a wider range of initial conditions.
- ★It would be interesting to learn why oxygen is depleted during this type of sputtering.
- ★Experiments similar to those reported here should be conducted using different age groups.
- 作者在提及自己正在进行或拟将进行的相关研究时，可用现在进行时或将来时，而且最好用第一人称做主语，以让读者了解这是作者自己的行为，而不是在提建议。
- ★In the future, we will investigate the effect of using an oxygen ambient.
- ★We are now conducting experiments on low- temperature deposition.
- ★The present authors are currently conducting experiments on low-temperature deposition.

## 7.结果的理论意义或实际意义

在表述结果的理论意义或实际意义时，多使用现在时，并辅以 may、might 或 should，表示作者对自己研究成果的应用价值非常肯定。

- ★The results of this study may lead to the development of effective methods for teaching grammar to language immersion students.
- ★Our findings may be useful to educators and others involved in curriculum development.
- ★The technique presented in this paper should be useful in reducing the amount of sludge in wastewater from semiconductor plants.

## 五、注意事项

- 作者应该以十分清楚、简洁的方式叙述自己研究中所获得的主要成果或发现。不要提到前文未涉及的新事实，也不要重复前文中关于研究动机与实验程序的详细描述。
- 结论的功能与摘要的功能不同。
- 结论部分的功能在于叙述研究工作最重要的结果及其内涵、结果的说明等结论，而不是概述论文的所有内容。摘要则是对整个论文的内容的概述，包括研究工作的目的、方法、主要结果及结论等信息。
- 切忌，不要在结论中直接重复论文正文中其他部分中的句子。
- 结论部分还常常描述作者的研究工作可能产生的应用或效益，或者指出本研究工作进一步深入的研究方向或具体的研究题目。然而，作者在书写可能的应用与题目时，不要过于勉强，特别是要避免夸大对效益的描述。
- 有些作者习惯在论文的讨论部分表达所有的重要结论，而省略了结论部分。建议作者先参阅拟投期刊已刊登的研究论文，以确定在期刊上的一般研究论文是否包含独立的结论部分。如果研究论文包含讨论部分和结论部分两者，则结论部分应该相当简短，只需简略、清楚地陈述作者研究工作的两三个主要结论即可，不要再重复罗列论文的讨论部分及其他部分已经表达清楚的一大堆资料。

# 第 8 章 结论部分(Conclusions)

## 一、结论部分的重要性

科技论文的结论部分紧跟在论文的讨论部分或结果与讨论部分的后面,位于论文正文的最后。

读者通常在准备阅读论文全文时,会首先快速地将结论看一遍,了解研究工作的主要成果,以便决定是否有必要认真地阅读全文或其中的一部分。因此。论文作者应十分重视结论的写作。

## 二、结束语的分类

➤结论型结束语(Conclusion/Remarks/Conclusion Comments 等):陈述或复述一下研究的发现和结果,进一步加深读者的印象,帮助读者系统全面地了解实验及研究所做出的结论。

➤总结型结束语(summary):概括全文的目的、内容要点和重点。在很短的篇幅内归纳研究纳过程、步骤、讨论的范围、用途和启示。

➤展望型结束语(Future Prospect/Commentary 等):对目前的研究加以评估,指出其中存在的问题、缺点与不足。

## 三、结论型结束语写法

### 1.基本内容

➤作者本人在研究中得出的主要论点,包括最重要的结果、结果的重要内涵,对结果的说明或认识等。

➤总给性地阐述本研究结果可能的应用前景、研究的局限性及需进一步深入的研究方向。

➤撰写结论时不应涉及前文不曾指出的新事实,也不能在结论中简单地重复摘要、引言、结果或讨论等中的句子;或者叙述其他不重要甚至与本次研究没有密切联系的内容。

“结果”、“讨论”与“结论”中应分别侧重的内容

结 果	讨 论	结 论
介绍研究结果(必要时应使用图、照片、表格等形式表述研究发现或实验数据)。	探讨所得到的结果与研究目的或假设的关系、是否符合原来的期望、与他人研究结果的比较与分析。	主要认识或论点。
对重要研究结果的描述。	对研究结果的解释;如果结果不符合原来的期望,为什么?	概述研究成果可能的应用前景及局限性。
对重要研究结果的评论(说明、解释、与他人结果的比较等)。	重要研究结果的意义(推论);研究展望。	建议需要进一步研究的课题或方向。

### 2.结论的表达与时态运用

➤通常使用一般现在时叙述主要研究结论,使用现在时的理由是作者并不是在表述自己特定的研究结果,而是在指出一些普遍有效的结论。

★The elastic collisions in the specimen cause (seem to cause, may cause) the photoelectrons to originate at shallower layers.

➤如果把结果说明的内容限定为只在此次特定研究的情形下才有效,则使用过去时。

★The elastic collisions in the specimen caused the photoelectrons to originate at shallower layers.

## 四、结束语常用的表达方法

### 1. 目的



➤直接点出目的

- ★The purpose of this article has been to review… 本文的…目的是考察…
- ★The purpose (aim/object) of this study was to examine… 本研究的目的是调查…

#### 举 例

★The main purpose of this article has been to review data that will be necessary to calculate departmental costs. 本文的主要目的是考察在计算部门成本时所需的数据。

★The aim of our research was to show whether when rubber is rubbed with fur opposite charges appear on the two bodies. 我们研究的目的是证明当橡胶与毛皮摩擦时,在这两种物体上是否会出现相反的电荷。

★The objective of these studies was to reveal that these two branches of sciences are mutually dependent and interacting. 这些研究的目的是揭示这两个学科分支是相互依存、相互作用的。

➤间接指出目的: 用不定式和一些单词表达目的。

- ★The foregoing discussion… is presented to… 前面讨论…的目的,是为了…
- ★The present study was designed to… 本研究的目的是…
- ★The present investigation was made in order to… 本研究的目的是…

#### 举 例

★The foregoing discussion of electric power transmission is presented to demonstrate that pipelines carrying chemical fuel are far more efficient and reliable at delivering energy than are electric wires carrying electricity.

前面针对电力传输所作的讨论是为了证明管路输送化学燃料要比电线传输电力的效率高得多。

★The present study was made in order to obtain information about the fact that charged bodies behave in this way.

从事本研究的目的是为了获取有关数据,说明带电物体确实具有这样的性质。

★These investigations were intended to provide evidence that the strength and the direction of the magnetic field around the solenoid carrying a current have a connection with those of current passing by. 这些研究的目的是证明在有电流的螺线管周围磁场的强度和方向与通过电流的强度和方向有关。

## 2. 回顾论文内容和范围

在总结型结束语中,常常对上文中的实验或研究的方法、步骤和过程进行总结和归纳,因为上文往往比较长。比较繁琐,对其中的具体细节不容易记得很完整、很清楚,所以有必要在结束语中,把重要的一些方法、步骤及过程再整理、归纳,使上文的写作条理、逻辑顺序更加明白易便。

#### 句型

- |   |                                       |
|---|---------------------------------------|
| ★In this study…was estimated by…                              | ★In the present study … is considered |
| ★…has been determined…  | ★The review…has covered…              |
| ★This research explored…                                      | ★This study examined…                 |
| ★In the above study experiments…has been determined…          |                                       |
| ★In this study…has been developed to…It has been stated that… |                                       |

#### 举 例

★In the present study, transient thermal stratification resulting from an internal source of electrical heating is considered. 本文中研究了由内部电热源所引起的瞬间热分层现象。

★To reduce the incidence of trips caused by external disturbances, the installation of under-frequency relays at load centers, to isolate the station (without necessary tripping the units), is suggested in this study. 为了降低由于外界干扰所导致的跳闸发生率,本文建议在负载中心安装低于额定频率的继电器。以便与电站绝缘(不必在机组上跳闸)。

★In this essay we have investigated whether the principle of Archimedes operates in air and other

gases as well as liquids. 在本文中，我们研究了阿基米德原理是否不但适用于液体而且也适用于空气和其它气体。

### 3.回顾论文的中心和焦点：本文的中心(焦点)是(在于)...

★This study focused...on...

★The vast majority of research...has focused on...

★This study centered on...

★The...focus of this article was on...

★*This study focused only on* the characteristics and experiences of a random sample of students who were new Fall 1984 freshman at a university. 本研究的焦点只是对一部分 1984 年秋入学的一年级新生作抽样调查，研究他们有何特点和经历。

★*This study centered on* the major factors revealed in a pilot study to be important to performance in practical chemistry as perceived by a sample of chemistry students and teachers. 本研究的中心是试验性研究中所揭示的主要因素。根据被抽样的师生的看法，这些因素被认为在学习应用化学时是具有重要意义的。

★*This review concentrated on* the 23 continuum standard-setting methods. 本研究的焦点是 23 种连续标准的设定方法。

### 4. 总结和归纳

★To summarize his views regarding...

★To summarize..., 总结...

★By summarizing the research on...

★In summary/sum/general/brief/etc...

★Based on these results, summary answers to ... are...根据这些结果可以总结出...的答案是...

★Research findings...can be...summarized in terms of..., 本研究的内容可以归纳为...

★To summarize these three simulations, there was no significant difference in the rate of gain. 总结这三个模拟形式。在学习的速度方面没有多大的区别。

★The discussion of this article may be summarized in terms of the improvement of service to the campus community. 本文讨论的内容可以归纳为：改善对校内师生的服务。

★The above research is perhaps best summarized in two brief sentences as follows. 上述的研究也许可用下面两句简短的话最恰当地加以概括。

★The whole essay may be briefly summarized in the following outline. 整个论文可以用下面的提纲简短地加以概括。

### 5. 得出结论的表述方法

★The conclusion from these comparisons is that... 根据这些比较得出的结论是...

★The results of...prompt...conclusions..., ...的分析结果，提出..结论...

★...study led to...conclusions..., ...的研究得出结论...

★The results of the analysis of the Science Interest Scale prompt three conclusions. First... Second... Third... 对科学兴趣尺度的分析结果，提出三个结论。第..., 第二..., 第三...

★The conclusion from these comparisons is that  $\beta$ -laetamases and transpeptidases shared a common ancestor, as suggested many years ago by Pollock; naturally, inferences about the course of evolution remain somewhat tentative. 根据这些比较得出的结论是  $\beta$ -laetamases 和 tranapeptidases 有共同的祖先，正如许多年前 Pollock 所提出的那样；自然，关于演变过程的推断多少还是尝试性的。

### 6. 证明/证实某个观点或结论

指出某个研究或试验证明、揭示了什么样的观点或理论。

★It has been shown that..., 已经证明了...

...was shown to, 已经证明了...

★The results of...confirmed... ...的结果证实了...

- ★The results show that... The results also show that... 结果证明...,结果还证明...
- ★This paper proves that... 本文证明了...
- ★It has been revealed..., 已经揭示了...
- ★The available research suggest that... 现有的研究建议...
- ★The results of... suggest that... ...的结果...表明...
- ★In conclusion, this analysis shows... 总之, 本研究表明...

#### 举例

- ★***It has been shown that*** for transport and storage of energy chemical fuels offer many advantages over the competitive electrical systems. (已经证明了...)
- ★Under draughty conditions, the PVC coating ***was shown to*** be an effective insulant. (已经证明了...)
- ★***Results of*** the regression analysis ***confirmed*** hypotheses as expected. (...的结果证实了...)
- ★In conclusions, ***this analysis shows*** progress has been made in promoting access to higher education and student financial aid has played an important roles in this progress. (总之, 本研究表明...)
- ★***The findings of*** the present study clearly ***demonstrate that*** the relationship between decline and effectiveness in the academic domain is not uniform across the three types of private colleges and universities. (...的结果...证实...)
- ★***In summary, the literature demonstrated that*** rater training could be used to reduce psychometric errors in performance ratings. (总之, 该文献表明.....)
- ★***The findings of tm study indicated that*** institutions experiencing declining enrollments between 1970 and 1976 were less effective in the core academic domain than those classified as stable or growing. (本研究的结果表明...)
- ★***In conclusion, the results of this study indicate that*** efforts to improve the psychometric quarry of students ratings of instruction should focus on the students themselves rather than on the scale format (总之, 本研究的结果表明...)
- ★***The available research suggests*** a multiplier of 1.2 as appropriate for a study of this nature. (现有的研究表明...)
- ★***The results of this study provide additional evidence as to*** why female academics are more confident within a teaching domain. (本研究的结果为.....提供了另外的证据)
- ★***The analysis has revealed that*** formal reasoning ability and prior knowledge are both significantly related to chemistry achievement of grade 11 students. (本分析揭示 r.....)
- ★***It has been revealed*** in the calculation of total heat loss in wall cavities (through which pipes often pass) containing stagnant air, it is important to include the radiation heat loss component. (已经揭示了.....)
- ★***The results of*** this study ***provide support for the theory of*** Finger regarding the development of notions of qualitative speed. (...的结果支持.....的理论)

#### 7. 关于“发现”的表述方法

➤阐述通过实验或研究有什么新的发现、并对以上的实验或论述部分作一综述。

- ★For ... find that..., 对...而言, ...发现...
- ★This study find..., 本研究发现...
- ★...was found in this study when..., 在...场合下, 本研究发现了...
- ★... were found to..., 发现.....
- ★The...finding of this study is what..., 本研究值得注意的发现是...

#### 举例

- ★***This study found that*** the single most significant variable in explaining student flows to the United

States is real domestic per capita income. (本研究发现…)

★In stagnant air conditions, thinly coated PVC pipes **were found to** perform no better than the uncoated copper pipes. (发现…)

★For earth scientists Bayer and Dutton **find that** the spurt obsolescence functions produces the best fit with the first and highest peak coming about 10 years into the career and the second peak occurring close to retirement. (对…而言…发现…)

★The noteworthy **finding of this study is that** institutions that have offices carrying out institutional research activities are, in fact, already engaged in planning and evaluation processes required to assess institutional effectiveness. (本研究值得注意的发现是……)

➤用先行词 It 引导发现和结论的描述

总结实验或者研究的结论，英语还常用主语从句的形式，所用句型为：It is evident that…，that 后边所引导的即是主语从句，表示结果。

★From the analysis of this study it is evident that…， 根据本研究数据的分析来看，很明显…

★It is clear from this study that… 根据本研究可以清楚地看出…

★It is clear that… 很显然…

### 举 例

★**It is clear that this study that** simply encouraging students to become involved in all aspects of social and academic life is not the answer to dissatisfaction, failure and attrition. (根据本研究可清楚地看出……)

★**It is apparent that** students enrolled in science classes in centers with exemplary programs have significantly different attitudes about their science teachers when compared to samples of students generally. (很明显…)

★**It is clear that** application of AI research to education represents the potential for profound changes. (很显然…)

### 8.关于展望前景内容的表述

指出目前所进行的研究的范围，并由此展望未来，预计其前景。

★In the future, when…， 将来，当…的时候…

★It seems very likely that in the near future, ... will find applications in…， 看来很可能在不久的将来…将会在…方面得到应用…

★Further studies are currently under way within…， 在…领域中正进行着更深入的研究…

★It is possible that ... will…,将可能…

★**It seems very likely that in the near future they will find applications** in several other fields, wherever complex problems involving conflicting constraints or competing factors arise.

(看来很可能在不远的将来……将舍在…方面得到应用…)

★From these preliminary data, continued investigation into the effects of environmental factors on self-efficacy beliefs are warranted. **Further studies are currently under way within** the research domain, where earlier findings indicate lower self-efficacy among female academics. (在…领域中正进行着更深入的研究…)

★**Working on the research agenda outlined will** do more than increase knowledge about effective teaching and identify the best means of evaluating teachers and their instruction; it will also help illuminate…(在草拟的研究日程方面所做的工作将…，它也将…)

★With the advent of multiple read/write media, the optical disk **will at last take its place as** a competitor and replacement for magnetic disks. (...作为一个…最终会占有其重要地位……)

### 9.指出将来的研究问题

➤说明目前研究或实验中所出现的困难或问题，指出什么问题现在还没有解决，还需要进步的研究与探讨；指出未来的研究重点是什么。基本句型为：在今后的研究中，要探讨……等。

➤有待解决的问题

★Several areas for further research might also be suggested. A further investigation might explore... Another investigation might explore..., 还可以提出可供深入研究的几个领域; 作为未来的研究课题之一, 可探索...; 另一个研究课题可探索...

★A number problems should be addressed by future research, and some of ... will be discussed in terms of..., 应该提出未来要研究的一些问题, 其中有几个...将以...来讨论。

★... is the imperative need to consider...in future research..., 在将来...迫切需要考虑...

★One concern needing further research is... 需要更进一步研究的一个课题是...

★Another research question is... 另外一个研究课题是...

★Further research is needed to find out... ...需要进一步研究, 一般弄清楚...

★More research is needed to... 需要做更做得研究以便...

**Several area for further research might also be suggested. A further investigation might explore** changes in learners' science conceptualization resulting from the implementation of resequenced content: a classroom applicable tool might be developed for determining whether or not the presence of content structure moves the learners closer to a perception of organized relationships among the sciences. **Another investigation might explore** possible gender differences in response to content structure. And lastly, a longitudinal investigation might follow up on the elective choices of secondary science courses by students from a resequenced content group compared to a nonresequenced content group; such a study might indicate the propensity of content structure for influence decision making in science course enrollment. (还可以提出可供深入研究的几个领域; 作为未来的研究课题之一,可探索...;另一个研究课题可探索...

★**One concern needing further research is** whether there are subsets of raters within a particular rating source and, if so, how and why come about, and with what consequence.

需要更进一步研究的一个课题是...

★What becomes abundantly clear from the findings of the present study **is the imperative need to consider** institutional differences **in future research** on the relationship between organizational decline and effectiveness in higher education. 在将来...迫切需要考虑...)

★The gender related differences reported in this study also raise further questions **that need to be investigated.** .....需要进一步研究)

★**Another research question is** the accuracy with which one group of raters knows or anticipates the ratings of other groups. 另外一个研究课题是.....

★This information may be used in teacher education course as well as a source of guidance to high school teachers who are interested in developing process skills in their biology classes. **Further research is needed to find out** whether the inter-relationships identified in this study are generalizable to other science. ...需要进一步研究, 以便弄清楚...

★**A need exists for better information on** why this phenomenon has taken place and how newly minted doctorates can be helped to complete their degrees more expeditiously. If present trends persist, the issue that Berelson once identified as number three may someday rise to number one on the list of policy concerns for graduate education. 还需要更多有关的信息.....

★Currently available standardized tests only begin to address the needs of assessment in higher education. **Much more work needs to be done** by the measurement community to comprehend the characteristics of instruments that are needed for assessment purposes. 有待...去做更多的研究以便...

★The training provided in the current study was based on telling students that teachers want to improve. **More research is needed to determine** how feasible (practical) this approach is and whether, indeed, it does increase students' desire to provide accurate ratings. 需要作更多的研

究以便……

➤对进一步研究工作的建议

★Little is known about… Future research should… 人们对…的了解不多，未来的研究应当…

★Further studies should also investigate… 进一步的研究还应当调查…

★…offers suggestions for further research …为进一步研究提出建议

★Further improvement of…will depend on… 对…的进一步改善要依靠…

★Another worthwhile study might explore… 另一个有价值的研究课题是探索…

★Little is known about the specific variables that influence the learning process. **Future research should** develop more precise, operational definitions of variables that can influence cognitive learning so that they can be systematically investigated.

人们对……的了解不多；未来的研究应当……

★The types of aid packages that are offered to minorities who apply to college should be closely monitored in future studies. …

应当在未来的研究中受到周密的追踪调查

★In light of the findings of the present study, **the following are recommended as possible area for further research**. Similar studies should be conducted with better control of extraneous variables.

★**Further study should also investigate** the acquisition and retention of formal reasoning ability. It might also be desirable to have replication studies carried out with pupils at other grade levels.

进一步的研究还应当调查…

★**Another worthwhile study might explore** the extent to which family member, counselor and peer advice is discouraging potential teachers from joining the profession.

另一个有价值的研究课题是探索…

## 五、时态问题

### 1.概述研究活动

结论部分的第一个句子或前几个句子常常是对研究目的或主要研究活动的概述。然而，也有不少作者不写概述而直接叙述主要结论。当文章使用“论文导向”时，研究活动的概述通常使用**现在完成时态**，而当文章使用“研究导向”时，则常常使用**一般过去时态**。

#### 论文导向句型

★In this paper, we have presented issues related to routing in a broadband LEO satellite network with an emphasis on delivering deterministic QoS to users.

★This paper has conducted the search for a practical magneto-caloric cooling configuration for the large near-room temperature refrigeration and air conditioning market

★Overall energy balances for the various compressor elements were established to model the heat transfer between each of the compressor elements.

★In this study, upsetting of AA 6082 was carried out for experimentally measuring friction areas ratios and normal pressure; five friction models were applied in finite element analysis in order to compare calibration curves of these models with the experimental results.

### 2.叙述主要结论

在结论中需要写出其中一些重要的研究成果时，通常使用**一般过去时**。

在叙述自己研究工作的主要结论时，作者通常可使用现在时以及推测动词，如 appears、seems 等或情态动词，如 may、could 等。使用现在时时，一般指作者陈述的结果不是在特定条件下的研究成果，而是具有普遍有效性的研究成果。



## 第9章 参考文献的标记和致谢

撰写论文一般离不开参考资料。一旦引用了他人的任何材料,就必须向读者提供参考资料的来源。

对文献的选用可反映出作者的学识、判断能力、甚至学风,因此,应尽量选择成果重要、推导正确、表达流畅、与论文主题密切相关的文献。

### 准确标注参考文献的目的

- 向原作者表达引用者的谢意;
- 向读者表明论文作者的研究广度和深度,加强论文的可靠性和权威性;
- 让那些对所引用的文献资料感兴趣的读者顺利地查找到引证出处。
- 使论文作者避免“剽窃”之嫌、证明论文作者的学者风范。

### 引用参考文献应遵循的原则

- 所选用文献的主题必须与论文密切相关,可适量引用高水平的综述性论文(以概括一系列的相关文献)。
- 必须是第一手资料。若为间接引用(即转引某篇论文的引文),则需要提及是从哪篇文献中转引的。
- 尽可能引用已公开出版、而且最好是便于查找的文献,即同等条件下优先引用著名期刊上发表的论文。
- 尽量避免引用非公开出版物,私人通信的注引方式应遵照拟投稿期刊的习惯或相关规定处理。
- 优先引用最新发表的同等重要论文。
- 一般不引用普通书籍(如大学奉科生教材等)。避免过多地,特别是小必要地引用作者本人的文献。
- 确保文献各著录项正确无误,如作者姓名,论文题目,期刊名及其年、卷、期或专著的出版年、出版地、出版社,起止页码等。

## 第1节 参考文献的引用

### 一、正文中参考文献的标注问题

➤要遵从相应期刊的标注形式,并且将引证标注放在句子中实际提及引文内容的地方。

★We have examined a digital method of spread-spectrum modulation for multiple-access satellite communication and for digital mobile radiotelephony 【1,2】.

应改为类似下面句子的更为清晰的标注:

We have examined a digital method of spread-spectrum modulation for use with Smith's development of multiple-access communication 【1】 and with Brown's technique of digital mobile radiotelephony 【2】.

➤避免随意引用文献,更不能在正文的次级标题中直接标出文献。

➤要尊重引文作者,评论他人研究的不足或欠缺时,绝不能说“... totally overlooked...”或“... ignored...”,应将这种表达转化为“...did not study...”

➤要确保正文中所标引的文献都包含于文末的文献书目中,反之亦然。

### 二、非公开出版物和电子文献的引用

### (1) 非公开出版物

尽量避免引用非公开出版物,如果确实需要引用,应在括号中标注(如 Z. Li, written personal communication, June 1996),并且要征求对方的书面同意。

已被接受发表的论文可列于参考文献中(在该文献条目的最后加注“In press”),在阅改作者校样时再尽量补齐年、卷、期、页码等信息。

### (2) 二次文献

如果确有必要引用二次文献(从某篇论文的引文中所获得的文献),但又无法得到,应在正文中清楚地说明是转引(间接引用)。例如:

○ Bowling (1991) cites the work of **Melzack and Torgerson (1971)** who developed the McGill Pain Questionnaire. 或:

○ **Melzack and Torgerson (1971, cited by Bowling 1991)** developed the McGill Pain Questionnaire. (Melzack and Torgerson<sup>21</sup> as cited in<sup>22</sup> developed....)或:

○ Bowling (1991, citing **Melzack & Torgerson 1971**) refers to the McGill Pain Questionnaire.

### (3) 电子文献

随着互联网的发展,电子版文献的引用越来越多。不同期刊对电子文献源的格式要求差异很大,有的只要求列出网址即可,有的则要求列出作者、文题、网址、访问日期等。具体应参阅拟投稿期刊的引用习惯或“作者须知”。

## 第2节 致谢的写法

论文中应向给予经费资助的项目和机关表示谢意,如国家自然科学基金项目、863项目等;对于那些虽然没有参加论文写作过程,但对论文内容给予了各种形式的帮助、支持、甚至是批评、建议、鼓励的个人或团体也应该表明谢意,放入 Acknowledgements 部分。

### Acknowledgments

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### Acknowledgements

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## 一、写作要点

➤致谢的内容应尽量具体、恰如其分

致谢某人可能暗含着某人赞同论文的观点或结论,如果被感谢的人并不同意论文的全部观点或结论,那么论文公开发表后被感谢的人和作者都会很尴尬。因此,如果是感谢一个思想、建议或解释,就要尽量指明这些内容。以免将被感谢的对象敏感而尴尬地置于为整篇论文承担文责的境地。

致谢的对象应是对论文工作有直接和实质性帮助、贡献的人或机构,因此,致谢中应尽量

指出相应对象的具体帮助与贡献。

为表示应有的礼貌和尊重，投稿前应请所有被感谢的对象阅读论文稿，尤其要包括致谢部分，以获得允许或默认。

### ►用词要恰当

要注意选用适当的词句来表达感谢之情，避免因疏忽而冒犯本应接受感谢的个人或机构。致谢的开始就用 *We thank*，不要使用 *We wish to thank*、*We would like to thank* 或 *The authors thank* 等。尤其是 *wish* 一词最好从致谢中消失。当表达愿望时，*wish* 是很好的词，但如果说 *I wish to thank John Jones*，则是在浪费单词，并且也可能蕴含着 *I wish that I could thank John Jones for his help but it was not all that great*(我希望感谢 John Jones 的帮助，但这种帮助并不那么大)。实际上用 *I thank John Jones* 显得更为简明和真诚。

### ►致谢的形式要遵从拟投稿期刊的习惯和相关规定

参阅拟投稿期刊的“作者须知”和该刊发表论文的致谢部分，注意其致谢的表达形式和相关要求，尤其是对感谢有关基金资助的信息，有些期刊要求将其放到“致谢”中，有些则要求将其放到论文首页的脚注中。

## 二、常见的致谢用词及其表达法

★Acknowledge      ★Grateful (ly)      ★Indebted      ★Indebtedness  
★Owe      ★Thanks      ★Appreciate

### 1. 以 Acknowledge 为核心的句型

该单词除了“对……表示感谢”和“鸣谢”之外，还有对“权威、权利、功绩”等的承认或确认之意，非常常用。基本句型：

- ...acknowledge the contributions made by...    ...对...所做的贡献表示感谢...
- ...acknowledge the assistance of... in ...    ...对...在...(方面)所给予的帮助表示感谢
- ...acknowledge the contributions of ... in...    ...对...在...(方面)所做的贡献表示感谢
- ...acknowledge the comment and issues raised by... on... for...  
    ...感谢...在...方面所做的评论和提出的意见，因为...
- ...acknowledge...who...    ...十分感谢...，他们...
- The contributions of/made by... are gratefully acknowledged.    作者十分感谢...所作出的贡献。
- Two Divisions of RARDE have been closely involved in the various projects which form the basis of this paper. **We are pleased to acknowledge** the contribution made by members of both Divisions.
- Material published herein was adapted from an Educational Testing Service research report and is used with their permission. **We gratefully acknowledge the contribution of** William Ruiz and Maribeth Vidal **in** the data retrieval, and of Lois Lyon **in** resolving questions of data element definition.
- I wish to acknowledge** the comments and issues raised by Herbert Marsh on the earlier analysis in this series, **for** some of them helped stimulate and guide my thinking on the present analysis.

### 2. 以 Thank, Grateful, Indebted 为核心的句型

- ...thank...for...    ...为...向...表示感谢
- ...be grateful / indebted to...for...    ...为...向...表示感谢 / 感激
- ...special thanks go to...for...    ...特别要为...而感谢...
- Particular thanks are due to...for /who...    应该向...表示特别的感谢，因为...
- Thank... who    向...表示感谢...他们
  - **The authors thank** the Directors of STC Technology Limited for permission to publish this paper. The work under phases I and II of VAD programme has been supported by the UKMOD.
  - **The author wish to thank** NASA **for** permission to publish the paper. Discussions with G.

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### 3.以 Owe to...为核心的句型

➤...owe much to..., who..., 本文应归功于..., 他们...

➤Much indebtedness is owed to..., who... 应该感谢..., 他们...

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### 4.感谢赞助和资助的表达方式

在很多论文的“致谢”部分，还经常可以见到 to be funded by, to be sponsored by ,with the support of 等表达方式，多用于说明研究项目或课题等的资金来源或赞助者。

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## 三、基金资助项目的英文表达法

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### 我国部分科学基金的英文表达举例

➤国家高技术研究发展计划: National High-Tech Research and Development Program of China (863 Program)

➤国家科技攻关计划: National Key Technologies R & D Program of China;

➤国家重点基础研究发展规划(973 计划): Major State Basic Research Development Program of China (973 Program)

➤国家基础研究计划: National Basic Research Priorities Program of China

➤国家自然科学基金(面上项目, 重点项目, 重大项目): National Natural Science Foundation of China (General Program, Key Program, Major Program)

➤国家杰出青年科学基金: National Science Fund for Distinguished Young Scholars

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## 四、实例分析

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简析: Timothy A. Springer 为本文的惟一作者,因而以个人名义表示感谢相关资金的资助(My work was supported by...)。本文是一篇 14 页的综述性论文,其中包括了 105 篇参考文献,即使如此,作者可能还应编辑的要求删减了部分参考文献,因而为此向读者和被删除文献的相关作者表示歉意。此外,作者还以个人名义感谢数位同行或朋友让其分享尚未公开发表的文献或数据,并感谢 Fred Rosen 的批

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# 第 10 章 特殊表达法和常用句型

写科技论文时，常用到英文的一些特殊表达方式和常用句型、词汇。在本章中，按公式、计算、度量、图解文字、注解、引用等方面分类，将这些表达方式的常用句型、词汇列出并附例句加以解释以供查阅。

## 第 1 节 公式的表达方法

在科技论文中，常常涉及到一些公式。在公式的引入、建立、条件设置、赋值、推导、修改、简化等过程中，有一些较常用的词、短语和句型。

### 一、公式的引入

- By using..., we introduce the following... equations.      利用...引入下列...方程式
- The functions...are introduced here to guarantee...,      在此引入...函数以保证...
- In an earlier paper, ...was introduced...      在先前的论文中引入了...
- In this paper we have introduced...,      在本章中引入了...

#### 举 例

○ *By using (25)~(28), we introduce the following state space equations...* (斜体字部分意为:利用……,引入下列……方程式)

○ *The functions  $I(x)$  and  $J(x)$ ,  $x=(X_1, X_2, X_3, X_4) \in R^4$ , are introduced here to guarantee the existence of solutions to (30)~(33) or the whole of  $R^4$ .* (斜体字部分意为:在此引入……函数以保证……)

○ *In an earlier paper, the ABS class of direct methods for linear systems was introduced.* (斜体字部分意为:在先前的论文中引入了……)

○ *In this chapter we have introduced two basic concepts: probability and the notion of hypothesis testing.* (斜体字部分意为:在本章中引入了……)

The true strain of forming fracture is given in the following equation [8].

$$\varepsilon = \frac{1}{c} \ln \sqrt{\frac{\pi}{6f}} - \sqrt{\frac{2}{3}} + en$$

where     $c$ : ratio of microcrack growing speed to deforming speed of alloy,  
           $f$ : volume fraction of precipitating phase,  
           $en$ : true strain of microcrack nucleation.

This formula is given under equation [8]

$$f = A\rho_0 \left( \frac{Dt}{KT} \right)^{2/3}$$

where     $A$ : constant,  
           $\rho_0$ : dislocation line density,  
           $D$ : diffusion coefficient of  $\delta'$  phase,  
           $T$ : aging temperature,  
           $t$ : aging time,  
           $K$ : Bohr constant.

## 二、公式的建立

- ...construct/establish/make up..., ...建立...
- ...be given by..., ...由...给出
- The formula for ... is..., 求...的公式是...
  - We *construct* suitable  $G$  maps in (3) by defining a defect function  $\in (\cdot); U \rightarrow R_1$ . (斜体字部分意为:建立……)
  - *In order to compute*  $G(u)$  for a general  $C_2$ -objective function  $F$ , it is necessary *construct and solve* (46c). (斜体字部分意为:为了计算…… 必须建立并求出……)
  - *The next step is to establish* an function that describes the risk associated with any give exposure level. (斜体字部分意为:下一步是要建立……)
  - The output voltage  $V_0$  from the circuit is *given by*  $V_0 = -RC \frac{dV_i}{dt}$  where  $V_i$  is the time varying input signal. (斜体字部分意为:……由……给出)
  - *The formula for* the standard error of means is:  $\sigma = \frac{\sigma_x}{\sqrt{N}}$ . (斜体字部分意为:求……的公式是……)

## 三、条件设置

- Let... be..., 设...为...      ➤ Assume that..., 假设...      ➤ Allow ... to be..., 使...成为
- For..., 如...      ➤ If..., 如果...      ➤ If...then..., 如果...那么...
- where..., 其中...

### 举 例

- *Let*  $(\Omega, F, P)$  be a probability space. (斜体字部分意为:设……为……)
- *Assume that*  $A$  holds, we will deduce  $B$  in the following form. (斜体字部分意为:假设……)
- However in this paper we shall *allow*  $x$  to be a random variable, and denote its distribution function by  $G(x)$ . (斜体字部分意为:使  $x$  成为……)
- For  $f \in b\epsilon$ , we shall write
$$P_t f(x) = P_t(x, f) = \int_{\epsilon} P_t(x, dy) f(y)$$
 (斜体部分意为:如……)
- *If*  $y \in bF^0$ :  $E^x(Y) = \int_{\Omega} Y(\omega) P^x(d\omega)$ ,  
and if  $Y = 1_A(X_t)$ , where  $A \in \epsilon$ , then the quality above reduces to
$$P^x(X_t \in A) = P_t(x, A)$$
  
(斜体字部分分别意为:如……;如……;其中……;那么……)

## 四、赋值

- Assign ... to..., 将...赋予...; 指定...到...
- Plug the data into the formula... 将数据代入公式
- Let... 令...
- Denote... 令...
- Denote ...by... 令...为...
- ...be defined to be... 被定义为...
- express...in terms of... 用...表示...

### 举 例

- Finally, randomly *assign* one member of each pair to the experimental group and the other to the control group. (斜体字部分意为:指定……到……)
- *I and J are given by*  $I(x)$ . (斜体字部分意为:……被赋值)
- *Plugging the data into the formula*, we get... (斜体字部分意为:将数据代入公式)
- *These values are then plugged into* the matched t-test formula.  
(斜体字部分意为:然后,这些值被代入……)
- *Let*  $u \in U_0$ . (斜体字部分意为:令……)
- We have *expressed*  $w$  in terms of the reduced temperature variable  $\varepsilon = (T_c - T)/T_c$ , ... (斜体字部分意为:用……表示……)
- We *denote* the M-dimensional distribution function of  $Z$  by  $F(Z_1, Z_2, \dots, Z_n)$ . (斜体字部分意为:令……为……)

## 五、公式推导

- Assume that...we will deduce... 假定...可推导出...
- ...be derived from... 从...推导出...
- Yield... , 产生出...
- ...be used to obtain... 用来获得(取得)...
- Combine ... and ..., we obtain..., 将...与...合并, 会得到...
- Since..., we have... 既然...就回有...
- Composition 合成, 合并
- Let ...be..., we define ...as... 令...为..., 把...定义为...
- Let...be...and consider..., 令...为...并假定
- Substitute...into... 将...代入...
- Plug...into... 将...代入...
- In terms of, 根据, 通过
- Evaluate, 求出, 求...的值
- where..., 其中...
- Compare...with..., 将...与...对比
- Be expressed as...,表示为...
- Notice that...,注意...
- Be replaced by...,由...替换

### 举 例

- *Assume that*  $A$  holds, *we will deduce*  $B$  in the following form.  
(斜体字部分意为:假定 ...可推导……)  
【译文】假设  $A$  保持不变,可以用下列形式推导出  $B$ 。
- The solutions can also be derived directly from (3.4).  
(斜体字部分意为:从……推导出)  
【译文】这些解也可以直接从(3.4)式推导出。
- Integrating this equation *yields*  $n = n_0 e$ . (斜体字部分意为:得出……)  
【译文】对此方程式积分可得出  $n = n_0 e$ 。
- The asymptotic expression for the confluent hypergeometric function *can be used to obtain* the following expressions. ... (斜体字部分意为:可以被用来获取……)  
【译文】合流超几何(超比)函数的渐进公式可以用来取得下列公式。……
- *Since*  $a = b$  *we have*  $c = d$ . (斜体字部分意为:既然……就有……)  
【译文】既然  $a = b$  就会有  $c = d$ 。

- Combining (1) and (2), we obtain  $a=b$ . (斜体字部分意为:将……和……合并, 会得)
- Expression (4.4) can be *evaluated* in a similar manner used above.  
【译文】(4.4)式可用上述相似的方法求值。
- Substituting (3.18) below into the above equation in terms of the parameter  $\alpha$  in HL's notation, we have ... (斜体字部分意为:将……以……的形式代入……)
- Substituting (3.5) and (3.6) into (3.4) and *evaluating* the resulting integrals according to 11.4.28 in HMF, we obtain the following result, ...  
where  $M$  represents the confluent hypergeometric function.  
(斜体字部分分别意为:把……代入……; 求……的值; 其中……)
- These values are then *plugged into* the matched t-test formula.  
(斜体字部分意为:然后,……被代入……)
- ... and equation (3.10) can be *manipulated into* the form ...  
(斜体字部分意为:转换 成……)

## 六、公式修改

- Modify..., 修改...
- Rewrite ... as..., 改写为...
- The ...expression can then be rewritten as... 则...表达式可被改写为...
- If we use ...for..., then we can write... 假如用...代表..., 那么可写出...
- The...formula can also be written as... ...公式也可写成...

### 举 例

- In this section we *rewrite* (14), (24), (26) as... (斜体字部分意为:将…… 改写为)  
【译文】在本节中,我们将(14)、(24)、(26)改写为……
- This is the *Modified* Projected Newton Scheme for Discrete-Time Optimal Control Problems. (斜体字部分意为:被修改的……)  
【译文】这就是经修改的分时最佳控制问题牛顿投影方案。
- The above mathematical *expressions can then be rewritten as*  $\Delta E \Delta t \geq h/4\pi$ . (斜体字部分意为:则……表达式可被改写成……)
- Mathematically speaking, *if we use*  $\Delta\gamma$  for the duration of the pulse, *then we can write*  $\Delta\gamma \Delta t \geq h/4\pi$ . (斜体字部分意为:如果用……代表……,那么可写出……)  
【译文】数学上,如果用  $\Delta\gamma$  代表脉冲宽度,那么可写出  $\Delta\gamma \Delta t \geq h/4\pi$ 。
- The  $t_{\text{observed}}$  *formula can also be written as*  $t_{\text{observed}} = \frac{\bar{x} - \mu}{S_x / \sqrt{N}}$ .  
(斜体字部分意为:……公式也可被写成……)  
【译文】求  $t_{\text{observed}}$  的公式也可写成  $t_{\text{observed}} = \frac{\bar{x} - \mu}{S_x / \sqrt{N}}$ 。

## 七、公式、概念的简化

- To simply..., 为简化...起见
- Be simplified..., 被简化为...
- Simplified version of ... 被简化的形式/简化式
- In simplified form..., 以简洁的形式...
- For simplicity... 为简洁起见

### 举 例

○ To *simplify* our notation, we now let  $L(u)$  denote the  $u$ -Hessian of the Lagrangian  $l(u, s)$ . (斜体字部分意为:为简化……起见)

【译文】为简化概念起见, 现令  $L(u)$  表示拉格朗日  $l(u, s)$  的  $u$ -Hessian。

○ The recursions in (67)~(71) are *simplified* considerably here. (斜体字部分意为:……被简化)

【译文】(67)~(71)中的递归在此被大大简化了。

○ The timekeeping elements of common quartz watches and clocks are *simplified versions* of quartz frequency standards. (斜体字部分意为:……的简化形式)

【译文】普通石英钟和时钟的计时部件是被简化的石英频率标准形式。

○ In *simplified form*, atomic beam resonance involves three steps. (斜体字部分意为:以简化的形式)

【译文】简洁地说, 原子束共振包括三个步骤。

○ For *simplicity*, we write the discount factors as a constant  $\alpha$  here. (斜体字部分意为:为简洁起见……)

【译文】为简洁起见, 在此将衰减系数写作常数  $\alpha$ 。

## 八、解、解法

- Solve..., 解决, 解答
  - Be solved by..., 由...解答
  - Obtain the solution to..., 得出...的解
  - The solution to..., 对...的解
  - ...is the unique solution of... 是...的唯一解
- 举 例

○ The class can be applied to *solve* a nonlinear system of equations.  
(斜体字部分意为: 解答……)

○ An optimal feedback strategy  $u$  may be found by *solving the following problem*.  
(斜体字部分意为:通过解答下列问题的方法)

○  $\delta u^*T$  is the *unique solution* of the linear equation.  
(斜体字部分意为:是……的唯一解)  
【译文】 $\delta u^*T$  是线性方程的唯一解。

○ The functions  $I(x)$  and  $J(x)$ ,  $x = (X_1, X_2, X_3, X_4) \in R^4$ , are *introduced here to guarantee the existence of solutions* to (30)~(33) or the whole of  $R_4$ .  
(斜体字部分意为:在此引入函数……以保证……有解)

## 九、对公式所做的一般性解释

- We explain how... 解释何以...
  - The formula says that... 该公式意为...
  - Be expressed in terms of... 用...来表示
  - Be said to be... 被说成是...
  - Can be expressed as... 可用...加以表示
  - Be called... 被称为...
- 举 例



○ We *explain how* our approximation is constructed below.

(斜体字部分意为:解释何以……)

【译文】以下解释近似值是如何建立起来的。

○ The formula says that we can find the standard deviation of the means by dividing standard deviation of our sample by the square root of the sample size. (斜体字部分意为:该公式意为……)

【译文】该公式的意思是,可通过用样本总数的平方根除样本标准差的办法求出均值的标准差。

○ These conditions, and subsequent developments as well, *are conveniently expressed in terms of* the subspaces. (斜体字部分意为:用……来表示)

【译文】这些条件以及其后的进展适合用子空间来表示。

○ The solution given by (15) *can be represented as*  $u^j(x) = \infty \int^a x(\pi_j)$ . (斜体字部分意为:可用……加以表示)

○ A vector satisfying (5e) *is said to be* nondegenerate. (斜体字部分意为:被说成……)

## 第2节 计算

在科技论文中,表达计算方面的问题会涉及到一些和计算有关的概念和一些相对固定的表达法。本部分主要列举关于计算问题的一些常用词、短语和句型的英文表达法。

### 一、比例、比率

- The proportion of... , ...的比例
- Be proportional to..., 与...成比例
- Be inversely proportional to... 与...成反比
- Contribute proportionally to... 对...起作用

#### 举 例

○ The precision to which  $f$  can be measured *is proportional to* the quality factor. (斜体部分意为:与……成比例)

【译文】 $f$ 的可测精度与质量因数成正比。

○ The amount of the shift *is proportional to* the velocity of the atom. (斜体部分意为:与……成比例)

【译文】偏移量与原子速度成正比。

○ Velocity *is proportional to* the square root of the kinetic energy. (斜体部分意为:与……成比例)

【译文】速度与动能的平方根成正比。

○ All else being equal, the precision to which the resonance frequency can be measured *is inversely proportional to* this smearing. (斜体部分意为:与……成反比)

○ Furthermore, smearing *is often inversely proportional to* the time the atom is in the apparatus. (斜体部分意为:与……成反比)

○ The two rules *contribute proportionally to* the final motor speed. (斜体部分意为:对……起作用)

### 二、幅度、大小

- Magnitude 幅度, 大小
- Decide the magnitude of..., 确定...的大小
- Range from...to..., 在...范围变化
- Range over..., ...的范围是...
- Enlarge the scope of..., 扩大...的范围

#### 举 例



- The *magnitude* of  $R_s$  at any point is equal to its distance from the axis of rotation. (斜体部分意为：幅度)  
【译文】任一点的  $R_s$  幅度都等于从旋转轴至该点的距离。
- It can be used to *decide the magnitude of* an angle. (斜体部分意为：确定……的大小)  
【译文】它可被用来确定一个角的大小。
- The thermometer *ranges from*  $50^\circ$  to  $60^\circ$ . (斜体部分意为：在……范围变化)  
【译文】这种温度表的升降幅度为55度至60度。
- Their researches *ranges over* a wide field. (斜体部分意为：……的范围是……)
- They decided to *enlarge the scope of* military operations.  
(斜体部分意为：扩大……的范围, 尤指活动范围)  
【译文】他们决定扩大作战的范围。

### 三、倍数

- Be ... times greater (less) than... 比...大(小)...倍
- Can be ...times precise than... 可能比...精确...倍
- About ... time that of... 大约是...的...倍
- ...times as ...as... 是...的...倍

#### 举 例

- Thus the rate at which long-wave photons leave the earth, for example, *is roughly 20 times greater than* the rate at which visible and near-infrared photons arrive, because the energy per proton *is around 20 times less*. (斜体部分意为：比……大20倍;比……小20倍)
- The surprising result: on average, the tunneling photons arrived before those that traveled through air, implying an average tunneling velocity of *about 1.7 times that of* light. (斜体部分意为：大约是……的1.7倍)
- New technologies, relying on the trapping and cooling of atoms and ions, offer every reason to believe that clocks *can be 1000 times more precise than* existing ones. (斜体部分意为：可能会比…精确1000倍)  
【译文】以捕捉和冷却原子和离子为基础的新技术有各种理由使人相信, (未来的)时钟可能会比现有的时钟精确1000倍。

### 四、大于、小于、等于符号的读法

- = is identically equal to
- $\cong$  is approximately equal to,  
approximately equals
- $a=b$  a equals b, a is equal to b, a is b
- $a \neq b$  a is not equal to b, a is not b
- $a > b$  a is greater than b
- $a \geq b$  a is greater than or equal to b
- $a < b$  a is less than b
- $a \leq b$  a is less than or equal to b

### 五、四则运算

- Addition/add 加

○ The computer card can tell the computer to *add* (+), *subtract* (-), *divide* (×), or *multiply* (÷) any of the variables. (斜体部分意为: 加、减、除、乘)

【译文】计算机卡告诉计算机去加(+)、减(-)、除(÷)或者乘(×)任一变量。

○ Square each individual deviation and then *add them up*. (斜体部分意为: 将它们相加)

【译文】求各偏差的平方并将它们相加。

➤...and...is/makes..., ...加...等于...(用于小数目)

One and two is/makes three. 1 加 2 等于 3。

➤...plus...is/equals..., ...加...等于... (用于大数目)

Seventy plus eighty is/equals one hundred and fifty. 70 加 80 等于 150。

➤Subtraction / subtract 减(用于大数目)

○ In places cloud-free images were unavailable, the researchers artificially *subtracted* the clouds, pixel by pixel. (斜体部分意为: 减去)

【译文】在得不到无阴影图像的地方, 研究人员就一个像素一个像素地人工减去阴影。

○ Forty-three *subtracted from* eighty-five is / equals forty-two. (斜体部分意为: ...从...中减去等于...)

【译文】从85中减去43等于42。

➤...from...is/leaves..., ...从...减出等于...

Five *from* six is/leaves one. 从 6 中减去 5 等于 1。

➤...take away...is/makes..., ...减...等于...

Six take away five is/makes one. 6 减 5 等于 1。

➤...minus ...is/equals..., ...减...等于...

Eighty-five minus forty-three is/equals forty-two. 85 减 43 等于 42。

➤Multiplication / Multiply, 乘(用于大数目)

Ninety multiplied by sixty equals five hundred and forty. 90 乘 60 等于 5400。

➤Three sevens are..., 3 乘 7 等于...

Three sevens are twenty-one. 7 乘 3 等于 21。

➤...times... is/makes..., ...乘...等于...

Ninety times sixty is/makes five hundred and forty. 90 乘 60 等于 5400

➤division / divide, 除(用于大数目)

➤...into... is/goes..., ...除...等于...

➤...divided into... equals..., ...除...等于...

➤...divided into... equals..., ...除...等于...

○ Seven *into* twenty-eight is/goes four. (斜体部分意为: ...除...等于...)

【译文】7除28等于4。

○ Twenty-eight *divided by* seven is four. (斜体部分意为: ...除以...等于...)

【译文】28除以7等于4。

○ Seven *divided into* twenty-eight equals four. (斜体部分意为: ...除...等于...)

【译文】7除28等于4。

○ Since we want to know the average amount of variation from the score, we could simply *divide* the total by N. (斜体部分意为: 用...除以...)

【译文】鉴于我们想知道该分数的平均偏移量, 我们只要用总数除以 N 即可。

## 六、求平均值

➤Mean (mean value) 平均, 平均值 ➤Average 平均, 平均数

- First, let's *take the mean (mean value)* for them. (斜体部分意为: 取……的平均值)  
【译文】首先, 取它们的平均值。
- *The mean of* 10, 9 and 5 is 8. (斜体部分意为: ……的平均数)  
【译文】10、9 和 5 的平均数是 8。
- The result is *beyond the average*. (斜体部分意为: ……超过平均值)  
【译文】结果超过平均值。

## 七、幂、根

- To the…power…次幂                      ➤ Square 平方, 求…的平方  
➤ Square root 平方根                      ➤ Cube 立方                      ➤ Cubic root 立方根

### 举例

- If *a to the minus fifth (power)* is *b*, we can obtain the following equation. (斜体部分意为: ……的……次幂)  
【译文】如果 *a* 的负5次幂等于 *b*, 就可以得出下列公式。
- We take the *square root* to get the standard deviation. (斜体部分意为: 平方根)  
【译文】我们计算平方根以求得标准差。
- The *square root* of 4 is / equals plus or minus 2. (斜体部分意为: 平方根)  
【译文】4 的平方根是  $\pm 2$  (即  $\sqrt{4} = \pm 2$ )。
- Let *a cube* be *b*, then we have  $c=d$ . (斜体部分意为: *a* 的立方)  
【译文】令 *a* 的立方等于 *b*, 那么, 就有  $c=d$ 。  
注:  $a^3$  的其他英文表达法: *a cubed*; *the cube of a*; *a to the third power*; *a to the third* 分别译为: *a* 的立方; *a* 的立方; *a* 的3次幂; *a* 的3次幂。
- In order to get rid of the minus scores and the problem of its balancing out to zero, *square the individual variation scores*. (斜体部分意为: 取……的平方值)  
【译文】为了去掉负分数并摆脱其抵消为零的问题, 可取各偏移分数的平方值。

## 第3节 度量

### 一、维数的表示法

- Dimension 维、度                      ➤ Draw...in ...dimensions 是...维的  
➤ Be of ...dimensions...是...维的                      ➤ The three dimensions 三维的
- A line has *one dimension*, a plane has *two dimensions*, and a cube has *three dimensions*.  
(斜体部分分别意为: 一度空间; 二度空间; 三度空间)
- What we are going to discuss next is about *three-dimensional space*.  
(斜体部分意为: 三维空间)
- The [*three*] *dimensions* of the object are 10cm, 6cm and 8cm.  
(斜体部分意为: 长、宽、高)

### 二、线段的表示法

- 垂直线: perpendicular lines                      ➤ 弧: arc, curve                      ➤ 曲线: curve  
➤ 虚线: dotted line                      ➤ 抛物线: parabola                      ➤ 单峰曲线: unimodal curve  
➤ 双峰曲线: double-peaked curve/bimodal curve                      ➤ 输出曲线: output curve  
➤ 曲率半径: radius of curvature 曲率半径                      ➤ 划线: draw a line

### 举 例

- Most of the scores *fall in the middle of this curve*, the high part. (斜体部分意为: 落到曲线的中部)
- The *double-peaked curve* is called a bimodal distribution because it has two midpoints. (斜体部分意为: 双峰曲线)
- These lines *curving away from the peak* are called “tails”. (斜体部分意为: 由……向外延伸)
- Draw a line from (point) A to (point) B. (斜体部分意为: 划线)
- Draw a line *parallel to A*. (斜体部分意为: 与……平行)

### 三、坐标

- 横坐标: abscissa      ➤纵坐标: vertical coordinates      ➤极坐标: polar coordinates
- 直角坐标: rectangular coordinates      ➤坐标变换: coordinate transformation
- 横轴: horizontal axis      ➤纵轴: vertical axis
- 坐标原点: origin of coordinates      ➤坐标方向: coordinate direction

#### 举 例

- On the *horizontal line*, enter the scores for the variable, and on the *vertical line*, enter the frequency of each of these scores. (斜体部分意为: 在横轴上, 在纵轴上)
- One *axis* represents position, and the other is velocity. (斜体部分意为: 一根轴代表……, 另一根是……)
- Constructing an *axis* and entering the frequencies would give us a bar graph that looks like Figure 5-1. (斜体部分意为: 作轴)

### 四、温度

- 📖 Fahrenheit temperature      华氏温度
- 📖 Centigrade temperature      摄氏温度
- 📖 Ambient temperature      环境温度, 室温
- 📖 Static temperature      静态温度
- 📖 Kelvin temperature      绝对(开氏)温度
- 📖 Martensite temperature      马氏体温度
- 📖 Transition temperature      转变温度
- 📖 Atmospheric temperature      常温, 大气温度
- 📖 Temperature shock      热震
- 📖 Fusion temperature      熔点, 熔化(熔融)温度
- 📖 Temperature differential      温差

#### 句 型

- 📖 Reach...temperature (s)      达到...温度
- 📖 The temperature rises as high as...      温度高达...
- 📖 The temperature has fallen [declined/ dropped] to...      温度已降低到...
- 📖 The temperature remains at...      温度保持在...

📖 ... degree below zero [minus...degree]零下...度

📖 The temperature reads... 温度为...

📖 Withstand a ... temperature 耐...度的温度

○ The temperature has fallen to 10°C below zero. (斜体部分意为: 温度已降到……)

【译文】温度已降到零下10°C。

注: 表示“温度已降到……”的英文句型还有 *The temperature has declined to...* 或 *The temperature has dropped to...*; 10°C below zero 也可写成 10°C sub-zero.

○ The temperature rises as high as 40°C. (斜体部分意为: 温度高达……)

【译文】温度高达40°C。

○ The liquid in the container has a temperature of 55°C. (斜体部分意为: 温度为……)

【译文】容器中液体的温度为55°C。

○ The material can withstand a 1 200-degree temperature. (斜体部分意为: 耐……度的高温)

【译文】这种材料可以耐1 200度的高温。

## 五、速度

📖 At (with) a (the) velocity (speed) of... 以...的速度

📖 Attain (reach/arrive at) a speed of... 达到...的速度

📖 Keep to (maintain) a speed of... 保持...的速度

📖 Regulate the speed of... 调整...的速度

### 句型

○ A plane of this type can fly at the velocity of sound. (斜体部分意为: 以……的速度)

【译文】这种飞机的飞行速度可达音速。

○ Light travels with the speed of 300 000 km per second. (斜体部分意为: 以……的速度)

【译文】光速为每秒300 000公里。

○ The ship attained a speed of 21 knots. (斜体部分意为: 速度达到……)

【译文】这艘船速度达到21节。

○ We should first regulate the speed of the machine. (斜体部分意为: 调整……的速度)



#### 第四节 图表表达方法

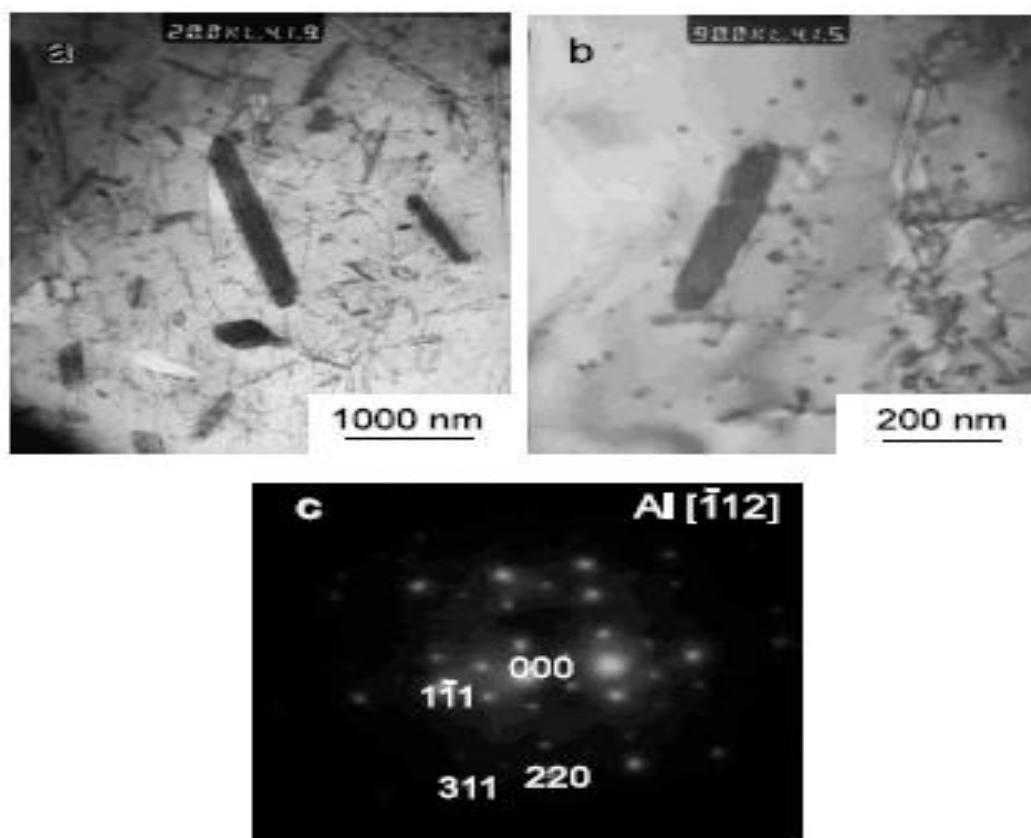


Fig. 2. TEM images of the initial sample (a and b) and SADP of Fig. 2a along the 112 zone axis of the aluminum matrix (c). Except for spots on the periodic rectangles made by the four indexed spots, all spots are from the long-plate type  $\text{MgZn}_2$  precipitate.

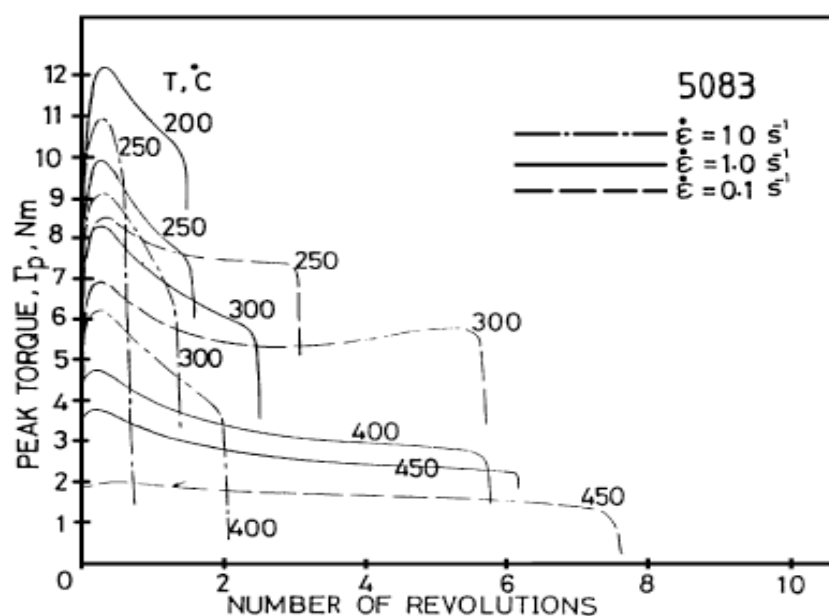


Fig. 1 Representative torque-twist curves for as-rolled 5083. The set at  $1.0 \text{ s}^{-1}$  clearly shows the decrease in peak stress, increase in ductility, and the closer approach to steady state as  $T$  rises. A few curves at 0.1 and  $1.0 \text{ s}^{-1}$  show that  $\sigma_p$  increases and  $\dot{\epsilon}_f$  decreases as  $\dot{\epsilon}$  rises



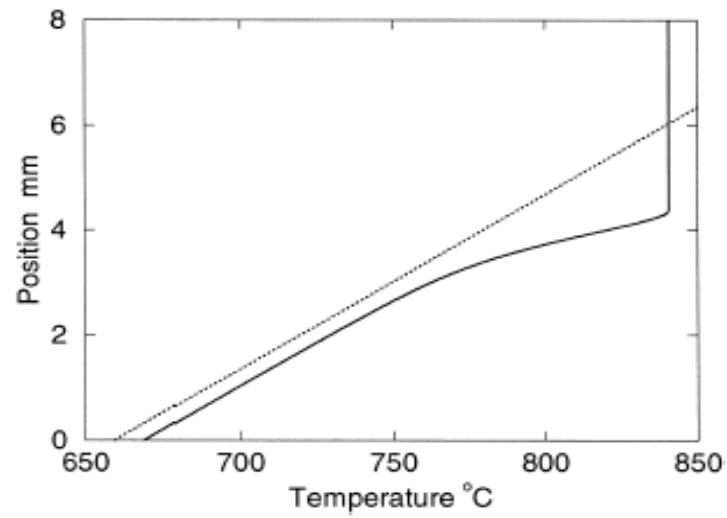


Fig. 1. Temperature profile (dotted line) and binodal line of the melt (solid line). Al + 5 wt.% Pb. The temperature gradient in the melt is 300°C/cm. The solidification velocity is 10 mm/s.

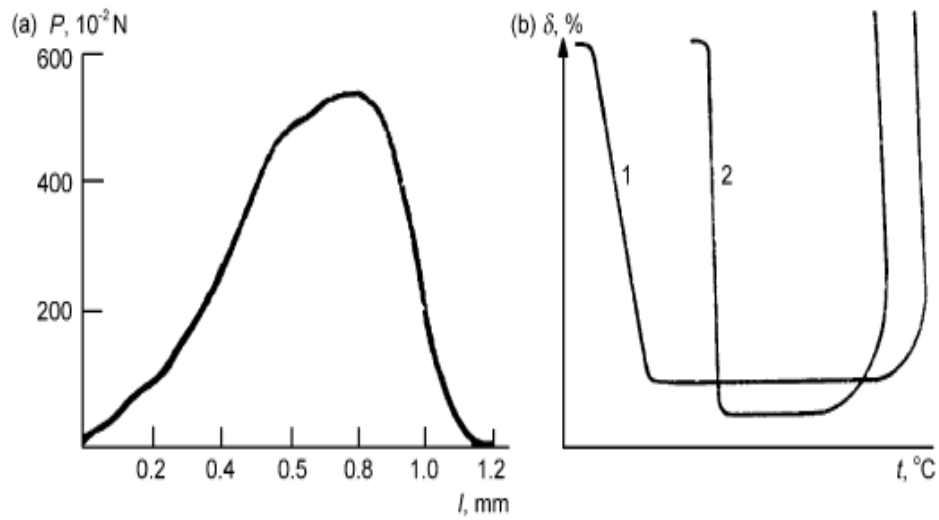


Fig. 2. (a) Typical stress-strain curve obtained for an Al-6% Cu alloy upon testing at 570 °C at a rate of 1 mm/min and (b) interrelation of elongation ( $\delta$ ) curves for cast (1) and deformed (2) samples tested in the semi-solid state upon remelting [11].

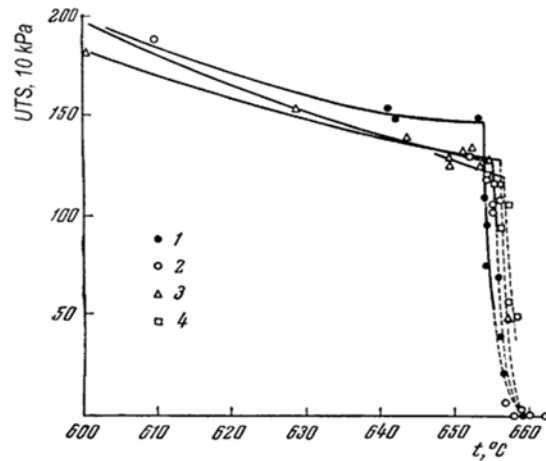


Fig. 6. Temperature dependence of the ultimate tensile strength of aluminium: 1—99.988% Al as-cast; 2—99.98% Al [48]; 3—99.988% Al annealed at 600 C for 7 weeks; and 4—99.998% Al as-cast [74] (reproduced by permission of the Institute of Materials, Minerals and Mining).

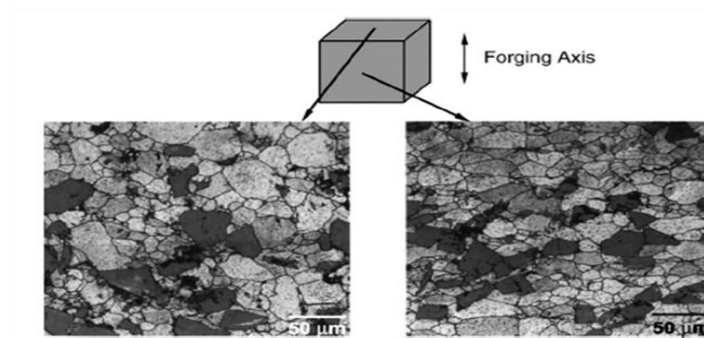


Fig. 4. Optical micrograph of forged microstructure of the composite, exhibiting some preferential alignment of SiC particles and Al grains perpendicular to the forging direction.

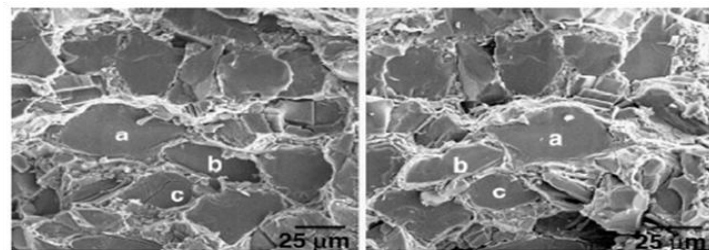


Fig. 10. Tensile fracture surface of the sinter-forged consisting of brittle fracture of the SiC reinforcement and ductile fracture in the Al matrix. The letters correspond to matching particle fracture surfaces.

# 第 11 章 英文写作中常犯的错误

## 一、不完整的句子

句子必须表达一个完整的观念。它含有比较完整意义的一组词，一般至少包括主语和谓语这两个主要成分。

不完整的句子包括：单独孤立的一个从句，两个并列动词谓语分割使用，介词短语、动名词短语、分词短语、动词不定式短语、及同位语的孤立使用。不完整的句子应该和其他合并在一起，以构成一个至少包含一个主句的完整句子。

➤单独孤立的一个从句。这些从句常以 after, although, because, before, if, since, when 或 while 开头。改正这种不完整句子的方法通常是将其并入前后的主句中。

不完整: Although the problem is complicated. We can solve the problem in only two hours with an electronic computer.

修正句: Although the problem is complicated, we can solve it in only two hours with an electronic computer.

➤把属于同一主语的两个并列动词谓语分割开来造成的。改正的方法是将分割出来的动词谓语与前面的句子合并。

不完整: Researchers have doubled the previous efficiency of producing hydrogen from water. And have made major advances in carbon nanotube storage technology.

完整: Researchers have doubled the previous efficiency of producing hydrogen from water and have made major advances in carbon nanotube storage technology.

➤介词短语、动名词短语不能孤立使用，可把这些不完整的句子通常并入前后的完整句子中。

不完整: To encourage the use of renewable energy electricity in the United States. Policy measures will be needed.

修正句: To encourage the use of renewable energy electricity in the United States, policy measures will be needed.

不完整: Within the broad variety of technologies that constitute renewable energy. Some are already making large inroads in the marketplace.

修正句: Within the broad variety of technologies that constitute renewable energy, some are already making large inroads in the marketplace.

➤祈使句是完整的句子，不过其易被读者理解的主语已省略。

❶ Analyze a set of tables or illustrations from either a professional journal or technical magazine.

❷ Now let  $NTU \approx \frac{U_c B_c L_c}{W_c}$ .

❸ Consider the situation in figure 4.2.

❹ Note that the maximum heat exchanger effectiveness is limited to 0.5.

❺ Assume  $\Psi = 0$  in Eqs. (D.48) and (D.47).

不完整: Given an input p. We can obtain the value of H using equation (6).

修正句: Given an input p, we can obtain the value of H using equation(6).

不完整: The amount of fluorine incorporated into the film on the substrate surface can be controlled. By reducing the amount of water added to the immersing solution.

修正句: The amount of fluorine incorporated into the film on the substrate surface can be controlled by reducing the amount of water added to the immersing solution.

## 二、缺少连接词

➤若英文句子中只有逗号来连接两个独立分句，而缺少任何连接词，则这个英文句子在文法上是错误的。

★Heat transport occurs via evaporation and condensation, the heat transport fluid is recirculated by capillary forces which automatically develop as a consequence of the heat transport process.

➤缺乏连接词的句子从表面上要表达一个完整的观念，但实际上表达了不止一个的观念，这样易使读者迷惑。

缺乏连接词: Assume that the wick thickness is small compared to the vapor space dimensions, then D and  $A_1/A_2$  are well represented by the Eqs. (E 8) and (E 9).

修正方法(1): 在逗号后加上适当的连接词(and, but, for, or, nor, so, yet)。Assume that the wick thickness is small compared to the vapor space dimensions, *and then* D and  $A_1/A_2$  are well represented by the Eqs. (E 8) and (E 9).

修正方法(2): 把其中一个独立分句改成从句或短语。If we assume that the wick thickness is small compared to the vapor space dimensions, *then* D and  $A_1/A_2$  are well represented by the Eqs. (E 8) and (E 9).

请注意: 上例中 then 是连接副词，而非并列连接词。

➤在连接副词(also, consequently, furthermore, however, moreover, otherwise, then, therefore, thus)前面，或在连接两个独立分句的转折插入语(for example, in contrast, in fact, on the other hand)前面，都必须加上句号或分号。这类连接副词或转折插入语后紧跟逗号，但是 hence, otherwise, therefore 及 then 之后常常不需放入逗号，尤其当之后的分句很短时，更是如此。

误: Consider the circuit shown in Figure (3), then we can draw its Norton-equivalent circuit as shown in Figure

正: Consider the circuit shown in Figure (3). Then we can draw its Norton-equivalent circuit as shown in Figure

## 三、主语和谓语不一致

在英文文法中，所谓“一致”是指句子成分之间或词语之间在人称、数、性等方面的一致关系，而主谓一致是其中的一种重要的关系。

在处理主谓一致性问题时要遵循的三条原则:

➤语法一致。例如主语为单数形式，谓语动词也采用单数形式。

➤意义一致。例如，主语形式虽为单数但意义为复数，谓语动词也采取复数形式；或者主语形式虽为复数但意义上视为单数，谓语动词也采取单数形式。

➤就近原则，即谓语动词的单、复数形式取决于最靠近它的词语。

误: The devices include pump sprays, Freon aerosols, pressurized rubber balloons, and hydrocarbon propellants. The last was initially considered most promising, but they are flammable and incompatible with food products.

正: The devices include pump sprays, Freon aerosols, pressurized rubber balloons, and hydrocarbon propellants. The last were initially considered most promising, but they are flammable and incompatible with food products.

➤由 every, each 或 no 所引导的单数主语必须配合单数谓语动词使用，即使以 and 连接数个这

种主语，其后也只能用单数谓语动词。不定代词 another, each, either, neither 及 one 后也用单数谓语动词。

- ❶ Every paper, proposal, and report is stored in my computer.
- ❷ Neither of the two generators is imported.
- ❸ No substance is a perfect insulator.
- ❹ Each of these lifestyles is associated with different goods and services.

➤若单数主语后面紧跟以 as well as, together with, along with, in addition to 开头的短语，即使短语中包含其他名词，单数主语还是配合单数动词谓语。

误：The actual research as well as the company's industrial activities *are* supported by many skills and disciplines

正：The actual research as well as the company's industrial activities *is* supported by many skills and disciplines.

误：The administration building with its dingy windows and deep gray paint, house the administrative offices, including the infamous fishbowl.

正：The administration building, with its dingy windows and deep ray paint, houses the administrative offices, including the infamous fishbowl.

➤名词词组中心词是“分数或百分数+of+名词(或代词)”，谓语动词的单、复数形式就取决于 of 后名词或代词的单、复数形式：若名词或代词是单数形式，则谓语动词也用单数形式；若是复数形式，则谓语动词也用复数形式。

- ❶ Over three-quarters of the swampland *has been* reclaimed.
- ❷ Two-thirds of the people present *are* against the plan.
- ❸ Half of the units *have been* in service for ten months.
- ❹ Half of the trouble *is* the fault of the drafting department

➤对于一些表示总和、比率、测量和数量的词语做主语时，虽然它们往往以复数形式出现，但是句子的谓语动词通常用单数形式。

注意，the number of 后跟单数动词，但是 a number of 后却必须用复数动词。

- ❶ Last year about forty hours *was* spent on that report.
- ❷ About eight pounds of carbon *is* added to the mix.
- ❸ A number of samples *were* collected from a different geographical region to see whether the phenomenon occurred there as well.
- ❹ The number of students in our university *is* great.

## 四、时态的误用

英文中共有 12 种时态，在科技论文中常用的五种时态是一般现在时、一般过去时、现在完成时、现在进行时及一般将来时。

一般现在时表达不受时间影响的普遍科学事实，以及论文作者的看法及建议。一般过去时用于记录过去发生的行动或存在的状态，如实验的步骤和计算机的仿真。一般将来时表示将要发生的行为或状态。现在完成时用来叙述到目前为止已完成(或刚完成)的动作，而且其结果或影响保留到现在，其着重点是现在的情况而不管这种过去动作所发生的时间。现在进行时表示目前正在进行而尚未完成的行为。

➤不要用现在完成时来叙述过去的事件。过去的事件应该用一般过去时。

误：The graduate school of Business **has been** founded **in 1925** at the urging of Herbert Hoover, a Stanford alumnus who was then serving as secretary of commerce in the Coolidge administration.

正：The graduate school of Business **was** founded in 1925 at the urging of Herbert Hoover, a

Stanford alumnus who was then serving as secretary of commerce in the Coolidge administration.

➤不要把现在完成时与过去完成时混淆起来。过去完成时用于表示在一个特定的、过去的事件或过去某一时刻以前已完成的行为。动词的过去完成时态很少出现在科技写作中。

❶ The reactor had worked twenty hours by ten o'clock yesterday evening.

❷ They began their experiment after they had read the instruction

➤静态动词不能使用进行时，只有动态动词(也称动作动词)才能使用表示动作目前正在进行的现在进行时。

静态动词指用来描述主语状态的动词，也称状态动词，包括 appear, afford, be, believe, concern, consist of, constitute, contain, correspond, exist, feel, forget, know, suppose, involve, mean, mind, need, own, possess, remember, represent, result in, satisfy, seem, smell, understand, yield 等。

误: Breadth is also important, because students **are needing to** appreciate the interplay among the functional areas of business.

正: Breadth is also important, because students **need to** appreciate the interplay among the functional areas of business.

误: Considerable uncertainty **is existing** about climate change responses to greenhouse gas emissions.

正: Considerable uncertainty **exists** about climate change responses to greenhouse gas emissions.

## 五、不正确的动词补语

➤动词补语是指用来补充说明动词意思的词或词组，通常以表语、直接宾语或间接宾语的形式出现。科技论文中，大多数是用动词不定式或 **that** 开头的从句作为补语。

❶ The purpose of this paper is to propose a new simulation method that dramatically reduces the time needed to conduct the simulation.

❷ The numerical results show that the pattern of distribution and magnitude of the radiative heat flux agree with the experimental data.

➤在科技写作时要注意一些动词不能带不定式结构做宾语，而只能带-ing 结构做宾语。这些动词常用的有 admit, acknowledge, anticipate, risk, appreciate, avoid, cannot help, cannot resist, cannot stand, consider, defer, delay, detest, ensure, escape, evade, finish, facilitate, imagine, include, keep (on), mind, miss, postpone, practise, put off, resent, resist, stop, suggest, contemplate 等。

➤有一些动词后既能带-ing 结构做宾语，又能带不定式结构作宾语，而意义无甚区别或相差不大，如 begin, continue, neglect, prefer, propose, start, require, attempt, intend, plan, permit, allow, recommend, advise, encourage 等。

➤有些动词之后用-ing 结构或不定式结构作宾语，意义上却有很大差别，这些动词如 try, mean, stop, forget, remember, leave off, go on 等。此外，在有些动词，如 let, make, see, have, watch, observe, feel 等之后，不定式作为宾语补足语时，要省掉符号 to。

❶ If you want to improve the simulation, try using GA. (try 作“试、试用”解)

❷ Smith tried to answer each question by himself. (try 作“努力、设法”解)

➤在动词 let, make, see, have, watch, observe, feel 等之后，不定式作为宾语补足语时，要省掉符号 to。



- ❶ Let N represent the number of customers in the system.
- ❷ A force is needed to make a body move.
- ❸ Suppose half of the customers exit the system at the same time.

## 六、被动语态的误用

在英文中，当强调行为的承受者或给予行为的承受者以较大的关注时，使用被动语态；当行为的执行者是物而不是人时，往往使用被动语态；当行为的执行者已被大家熟知而没有必要写出来时或不知道行为的执行者时，也使用被动语态。被动语态的句子常出现在科技论文中，尤其是当作者描述某种方法、过程或因果关系时。

➤若使用被动语态来指出自己的行为，一定要清楚表明自己是行为的执行者；当论文作者使用被动语态来陈述自己的研究目的及工作，或提出某些建议或主张时，一定要确定读者已了解论文的作者就是这些行为的执行者。

❶ It is believed that the annealing treatment improved the electrical characteristics of the film.

清楚：We believe that the annealing treatment improved the electrical characteristics of the film.

清楚：The annealing treatment appears to have improved the electrical characteristics of the film.

➤一般说来，以英语为母语的人把 believe 之类的动词写成被动语态，而又不明确这些动词的执行者时，他们的用意并不是表达“我们认为”或“我个人认为”，而是想表示所指的信念是普遍的或几乎普遍的信念，意味着“绝大多数专家都认为”。

❶ Legionnaires' disease is believed to be caused by bacteria.

❷ Effective illustrations are believed to transcend the text in the scientific and technical writing.

➤要注意动词 argue, assume, believe, desire, present, propose, recommend, suggest, suppose 的用法，这些词常用来表达作者的意图。

Now that the method has been modified, it is used to analyze the chemical heat pump dryer.



Now that we have modified the method, we can use it to analyze the chemical heat pump dryer.

➤假如句子本身已指明行为发生的地点，那么可以使用被动语态，因为读者已明白行为的执行者是谁。

若从句子的上下文中可以明显地了解行为执行者或行为发生的地点，则可以用被动语态。

不清楚：Two examples are employed to illustrate the urban heat island effect.

清楚：

❶ Two examples will be employed below to illustrate the urban heat island effect.

- ❶ Two examples will be employed here to illustrate the urban heat island effect.
- ❷ The following examples illustrate the urban heat island effect.
- ❸ In section 3, two examples are employed to illustrate the urban heat island effect.
- ❹ In this paper, two examples are employed to illustrate the urban heat island effect.
- ❺ In this paper, two examples were employed to illustrate the urban heat island effect.

➤被动语态句子陈述的事情必须与事实相符

在撰写科技论文时，经验丰富的作者常在句子中使用一般现在时态、被动语态的动词。由于这些句子所陈述的事情与事实相符，即它们能正确地描述属于标准做法或程序的某些行为，所以句子中的描述不受作者写作时的特定情况影响。

当我们使用一般现在时态、被动语态的动词来做某种观察或指出某件事情，被动语态的句子应该表达一个普遍的事实。

★In industry metals are often used in the form of alloys.

★Energy is neither created nor destroyed, but it may be transformed from one form into another.

不自然: From these data **it is seen that** the self-phase modulation and the self-frequency shift are enhanced by forward pumping.

自然: From these data **it can be seen that** the self-phase modulation and the self-frequency shift are enhanced by forward pumping.

修正句: These data **show that** forward pumping enhances the self-phase modulation and the self-frequency shift.

❶ Now these values are substituted into the equations of motion and the solution is obtained.

作者的目的是指出自己的求解方法，因此用一般现在时态、被动语态的动词就不妥当了。

❷ These values can now be substituted into the equations of motion to obtain solution.

❸ We can now substitute these values into the equations of motion to obtain the solution.

➤在确定动词不定式主语的基础上使用正确的语态。在决定动词不定式采用主动语态还是被动语态时，先要确定不定式中动词所暗指的主语(逻辑主语)。若这个主语是动词不定式所指行为的执行者，则动词不定式通常使用主动语态；若这个主语是动词不定式所指行为的承受者，则通常使用被动语态。

❶ He is the first to solve this problem.

❷ The prototype design is expect to be completed by September.

❸ Some molecules are large enough to be seen in the electronic microscope.

❹ The book seems to have been translated into many languages already

➤确定行为的执行者，以免混用主动语态与被动语态。被动语态表示某行为是由研究者某个动作所产生，主动语态则表示某个行为或事件是自己发生，或是另外一个行为或事件的结果，而不是由研究者的某个直接动作所致。

❶ When the A value goes beyond  $0.02\text{m}^2$ , the measured temperature does not decrease any more.

❷ After the polymer was placed in a tank, the temperature was increased gradually.

➤不及物动词不可以使用被动语态

不及物动词后面没有宾语，因此不及物动词没有被动语态。在科技论文中常用到的不及物

动词有 appear, arise, be, become, come, consist of, correspond, depend on, exist, happen, have, let, occur, proceed, remain, result in, rise, seem, tend, work, yield 等。也有些动词既可作及物动词,又可作不及物动词,如 develop, change。

误: The calculation was proceeded by the student.

正: The calculation was performed by the student.

正: The calculation was carried out by the student.

#### ►避免过度使用被动语态

虽然被动语态有很多用途,但是在撰写科技论文时不要养成随意使用被动语态的习惯。过多地使用被动语态,会使论文变得笨拙和失去主观意义,每个读者会排斥这种沉闷的、公文性的写作风格。此外,被动语态的滥用也导致句子出现垂悬修饰词语,这也是英文科技写作常犯的错误之一。一个训练有素的英文科技论文作者只有在必要的时候才使用被动语态,如在论述实验方法和分析计算的部分中。

## 七、主语、语态的随意更换

在英文科技写作中,应该避免将句子中的主语或语态做不必要的更换,不必要的主语更换,或不必要的主动语态和被动语态之间的更换,会使句子显得生硬、笨拙,同时还会给读者的理解带来麻烦。

病句: If we attempt to solve the equation in this form, several difficulties are encountered

修改: ★If we attempt to solve the equation in this form, we shall encounter several difficulties.

★If the problem in this form is to be solved, several difficulties are encountered.

★Attempting to solve the equation in this form leads to several difficulties.

## 八、垂饰修饰词

垂悬修饰词语是指句子中在语法上或逻辑上没有任何修饰对象的修饰词语,或者指似乎在修饰一个词但实际上不能合理修饰这个词的词语。

在科技写作中,常常会出现垂悬的修饰词语,其原因主要是以被动语态来描述行为是难于掌握的。另外,也许因为这些垂悬的修饰词语对专业读者的理解往往不会引起麻烦,所以许多论文作者对句子中出现垂悬的修饰词语采取容忍的态度。不过,在撰写正式的科技论文时,作者应该特别小心,要避免垂悬的修饰词语。

#### ►垂悬的分词短语

分词短语作状语时,其逻辑主语必须是句子的主语,否则必须给出其逻辑主语。

分词短语包含一个分词(现在分词或过去分词)、分词的宾语以及修饰分词及其宾语的词。位于句首的分词短语应该用来修饰句子的主语,若不能修饰句子的主语,则该分词短语就是垂悬的分词短语,必须对句子进行修改。

问题:分词短语似乎都修饰句子的主语,但是主语无法合理地产生分词短语所表示的行为

误: **Comparing** Huckin's **method** with ours, **the difference** between them is that we don't use external forces to join the panels in the model together.

正: Unlike Huckin's **method**, our **method** does not use external forces to join the panels in the model together.

误: **Examining** this problem, the following **fact** can be observed.

正: **Examining** this problem, **we** observe the following fact.

误: **Starting** the machine, an unusual **problem** occurred.

正: When the machine is started, all unusual problem occurred.

#### ►包含垂悬动名词的垂悬短语

在一个带有垂悬动名词的垂悬短语中,动名词通常当作介词的宾语使用。

After determining the mapping of A from  $L_a$  to  $L_p$ , the next array dimension can be processed in the same way.

存在的问题: after 引导的介词短语应该修饰句子的主语, 但是例句中的主语 dimension 无法执行 determining 这个行为。

误: After **determining** the mapping of A from  $L_a$  to  $L_p$ , the next array dimension can be processed in the same way.

正: After **determining** the mapping of A, from  $L_a$  to  $L_p$ , **we can** process the next array dimension in the same way.

正: After the mapping of A, from  $L_a$  to  $L_p$  is determined, the next array dimension can be processed in the same way.

正: After we determine the mapping of A from  $L_a$  to  $L_p$ , we can process the next array dimension in the same way.

正: Determining the mapping of A from  $L_a$  to  $L_p$  make us process the next array dimension in the same way.

#### ➤垂悬的不定式短语

通常位于句首的不定式短语应该修饰句子的主语, 否则就很可能是垂悬的修饰语。

差: **To write** effective software programs for banks, **training** in both computer science and finance is necessary.

佳: **To write** effective software programs for banks, software **developer** need training in both computer science and finance is necessary.

差: **To develop** a high-performance air conditioner, **it is** important to use an intelligent control system.

佳: **To develop** a high-performance air conditioner, **designers** use an intelligent control system.

#### ➤垂悬的省略从句

省略从句是指一个省略主语(有时还有 be)的从句, 而且被省略的主语与主句的主语相同。然而, 如果从句中被省略的主语与主句的主语不相同, 那么省略从句就成了一个垂悬的修饰词组。修改垂悬的省略从句有两种方法, 即在省略从句中加入合适的主语, 或改写这个省略从句, 以便从句能合理地修饰主句的主语。

误: When applying Kaviany's method in our simulations, the modeled objects had an unrealistic shape.

正: When we applied Kaviany's method in our simulations, the modeled objects had an unrealistic shape.

误: When simple, we can solve this type of problem quickly using the direct method.

正: When simple, this type of problem can be solved quickly using the direct method.

## 九、误置的修饰词

在英文句子中, 词或词组的位置反映了词或词组与句子中其他组成成分之间的关系。具有修饰功能的词或词组的位置一定要正确, 否则句子的意思变得不清晰, 使读者感到迷惑不解。

### 九、误置的修饰词

#### ➤程度副词

常见的程度副词有 much, little, very, enough, quite, fairly, extremely, considerably, entirely, completely, definitely, nearly, almost, hardly, approximately, partly, slightly, half, only, even 等。程度副词通常都放在它所修饰的词之前。

在撰写英文科技论文时, 要特别注意这些副词在句子中的正确位置, 它们往往与中文句子中的位置不同。

#### 举 例

误置: The United States only installed 420MW of additional wind capacity in 1998.

修正: The United States installed only 420MW of additional wind capacity in 1998.

误置: The experiment took three hours approximately.

修正: The experiment took approximately three hours.

注意下面两个句子意思之间的差别:

☉ The tests are nearly all completed.

☉ The tests are all nearly completed.

在第一个句子中 **nearly** 用于修饰 **all**, 句子的意思是“大多数的测试都已完成, 但还有少量的测试尚未做完”。第二个句子中 **nearly** 修饰的是 **completed**, 句子的意思就变成了“没有任何一个测试已经完成, 不过所有的测试都会很快完成”。

★ *Only* George said that he displaced his computer. 只有 George 说, 没有其他人这么说。

★ *George only* said that he displaced his computer. 他只说了这件事, 除此之外, 他没有做其他的事。

★ George said *only* that he displaced his computer. 除此之外, 他没说什么其他的事。

★ George said that *only* he displaced his computer. 他是唯一搬动计算机的人。

★ George said that he *only* displaced his computer. 他只搬动了计算机, 除此之外, 没有做其他的事。

George said that he displaced *only* his computer. 他没有搬别的东两, 也没行搬别人的计算机。

★ George said that he displaced *only* computer. 他只有有一台计算机, 而且他把这台计算机搬动了。

★ George said that he displaced his computer *only*. 他只搬动了

自己的计算机, 没有搬自己的其他东西, 也没有搬别人的东西。

#### ►副词修饰动词时的位置

副词修饰动词时, 多数的副词都可以放在动词后面, 如果修饰的是及物动词, 那么副词一般位于宾语后面。当动词谓语中出现情态动词且使用被动语态(如 **can be+过去分词**)时, 要特别注意修饰动词的副词的位置。

当作者有意强调一个副词或副词短语较长时, 可以将副词或副词短语放在句末, 而不放在它所修饰的动词的前面或后面。

### 举 例

★ The results *can be easily* obtained by using three following method.

改进: The results *can easily be* obtained by using three following method.

★ The student quickly and accurately answered the question.

改进: The student answered the question quickly and accurately.

#### ►明确修饰词

应该明确修饰词所修饰的特定词。

不清楚: The professor required his graduate students *often* to read references.

修正: The professor *often* required his graduate student to read references.

修正: The professor required his graduate student to read references *often*.

#### ►介词短语的位置

介词用在名词或代词等的前面, 以介词短语的形式表示它们与句中其他成分之间的各种关系(所属、时间、地点、方式、原因等)。

★介词短语作定语修饰名词时, 通常位于它所修饰的名词之后, 否则整个句子的意思会含糊不清。

★介词短语做状语时, 一般用来修饰动词或形容词, 其位置比较灵活, 可以直接放在被修饰的词之后, 也可以放在句首、句尾。

### 举 例

误置: The students **in chemistry** will conduct the experiment.

修正: The students will conduct the experiment **in chemistry**.

介词短语 In chemistry 似乎用来修饰 students, 但实际上应该修饰 experiment。

误置: The above theorem **in Appendix 1** is proved.

修正: The above theorem is proved **in Appendix 1**.

作者的原意是告诉读者:上述定理的证明见附录 1。

误置: This is a problem in classical physics **of great complexity**.

修正: This is a problem **of great complexity** in classical physics.

#### ➤定语从句的位置

定语从句通常应该紧接它所修饰的词。如果定语从句太长, 而使得定语从句直接放在它所修饰的名词之后, 会引起句子笨拙而不平衡, 那么就应该把定语从句移到比较恰当的位置(如放在句尾)。

### 举 例

★误置: A laser disk drive is used in the CD-ROM device **that** is the same size as a traditional 5.25-inch drive.

修正: A laser disk **that** is the same size as a traditional 5.25-inch drive is used in the CD-ROM device.

修正: The CD-ROM device has a laser disk drive **that** is the same size as a traditional 5.25-inch drive.

★误置: Information can be loaded into memory **that** is stored on ACD-ROM and then displayed or printed.

修正: Information **that** is Stored on ACD-ROM can be loaded into memory and then displayed or printed.

★错误: In section 4, experiments **in which** the proposed method is applied to control a standard industrial robot manipulator are described.

修正: In section 4, experiments are described **in which** the proposed method is applied to control a standard industrial robot manipulator.

修正: In section 4, we describe experiments **in which** the proposed method is applied to control a standard industrial robot manipulator.

★误置: In this report, an efficient algorithm **that** employs the concept of static equilibrium to determine the stability of clamping is developed.

修正: In this report, an efficient algorithm is developed **that** employs the concept of static equilibrium to determine the stability of clamping.

修正: In this report, we develop all efficient algorithm **that** employs the concept of static equilibrium to determine the stability of clamping.

➤许多定语从句是由“介词+关系代词 **which**”引出的, 关系代词在定语从句中作介词的宾语。如果用 **that**, 那么介词应放在从句的句末。

➤关系代词作定语从句中的及物动词或介词的宾语时, 经常可以省略。但关系代词作介词宾语时, 如果省略, 则介词要放在从句的末尾。

★The motor is a machine **in which** electricity is changed into mechanical energy.

★High-speed steel is a material the cutter is made **of**.

★Most of the things (which, that) we use are taken from the surface of the earth.

★Air will completely fill any container (that) it may be placed **in**.

➤当关系代词后面紧跟联系动词 **to be** 时, 关系代词及联系动词有时可以省略, 使句子显得简明。

★The results **that** were obtained are shown in Figure 2.

★The results obtained are shown in Figure 2.



★The obtained results are shown in figure 2

虽然这个句子在语法上无错(有人会理解成过去分词 **obtained** 作定语), 但是相比而言, **the results obtained** 这种写法较自然。

➤状语从句的位置

以 **although, because, since, until** 及 **after** 等连词开头的状语从句, 可以放在被修饰的词之后, 也可放在句首或句尾。作者一定要在明确句子意思能表达清楚的基础上, 确定状语从句的位置。若状语从句的位置不正确, 则会使句子变的模糊或生硬。

★误置: The sensors were used in the test systems **after** they were calibrated.

修正: **After** they were calibrated, the sensors were used in the test systems.

★误置: When they are combined with natural-gas-fired turbines, parabolic-trough systems can produce electricity for about 94kWh.

修正: When parabolic-trough systems are combined with natural-gas fired turbines, they can produce electricity for about 94kWh.

修正: When combined with natural-gas-fired turbines, parabolic trough systems can produce electricity for about 94 kWh.

## 十、不正确的复数名词

英文中, 可数名词通常有单复数形式; 不可数名词一般没有单复数名词之分, 但有时也以复数形式来表示不同的意义。

英文中有一些以-s 结尾的名词并不是可数名词, 它们当中有的作单数用, 有的作复数用, 有的既可作单数用又可作复数用, 常作单数用的以-s 结尾的名称包括某些疾病的名称、学科名称及某些地理名称等。

物质名词一般是不可数名词, 没有复数形式。但有些物质名词有时也以复数形式出现, 但意义不同。如 **water** 指水, **waters** 是领海。

一般来说, 抽象名词是不可数的, 因而没有复数形式。科技论文的作者撰写时, 一定要留意复数形式的用法。若名词应该用复数形式, 则切勿写成单数形式。此外, 千万不要把单数形式写成复数形式, 尤其不能将不可数名词写成复数形式。

不要把下面的不可数名词写成复数形式

literature	equipment	notation
research	work	terminology
information	software	hardware
knowledge	engineering	pollution
combustion	magnetism	business
proximity	orientation	degradation

科技论文还常出现以 **every, each, either, no, neither, another, no**。这些词后加名词的词组。这些词组中的名词不能写成复数形式。

还要注意: 若一个计量单位之前有一个数字, 则除非这个数字刚好是 1, 否则单位应该是复数形式, 不管数字是大于 1 还是小于 1。

### 举 例

★Every substance is constantly emitting radiant heat.

★Either answer is correct.

★No substance is a perfect insulator.

★The overall heat pipe length remains 40 inches (1.016 meter) and the heat pipe outer radius is 0.310 inches (0.0787 meter).

★The overall heat pipe length remains 40in (1.016 m)and the heat pipe outer radius is 0.310 in

(0.0787 m)

## 十一、不明确的先行词

在英文中，每一个代词必须有一个先前已提到的明确的它所替代的名词，这里称之为先行词。如果一个代词的出现使读者不能清楚地看出它的先行词，那么就可能引起读者的困惑。这一点对那些对论文内容不太熟悉的读者更是如此。

### 举 例

★不清楚: Gallium arsenide, as well as silicon, is studied in Philips, mainly in our French laboratories. We are particularly **interested in its qualities** that make it so suitable for ICs and FETs that are either extremely fast or have a very low power consumption.

修正句: Gallium arsenide, as well as silicon, is studied in Philips, mainly in our French laboratories. We are particularly **interested in the qualities of this material** that make it so suitable for ICs and FETs that are either extremely fast or have a very low power consumption.

★不清楚: When a formal financing system does not exist, a preselling system is established to make the market more effective. **It** can be found in a number of areas.

修正: When a formal financing system does not exist, a preselling system is established to make the market more effective. **The latter** can be found in a number of areas.

★不清楚: When it is important for a system to handle complex data, it is difficult to design **it** so that it also provides solutions quickly.

修正: It is difficult to design a system that both handles complex data and provides solutions quickly.

若使用一个代词来表达或代替前面整个句子或整段的意思，则不可以使用 **it**，而必须用 **this**。

误: After the initial investments have been made, the economics of renewable energy technologies improve in comparison with conventional technologies because operating and maintenance costs are low compared with those incurred using conventional fuels. **It** is especially high, and will be especially true in the future as fuel prices increase.

正: After the initial investments have been made, the economics of renewable energy technologies improve in comparison with conventional technologies because operating and maintenance costs are low compared with those incurred using conventional fuels. **This** is especially high, and will be especially true in the future as fuel prices increase.

### 避免使用多余的代词

★误: Oxygen is a gas that we obtain it from the air.

正: Oxygen is a gas that we obtain from the air.

★误: For a program with n iterations, there are n iterations in its corresponding DFG.

正: For a program with n iterations, there are n iterations in the corresponding DFG.

正: A program with n iterations has n iterations in its DFG.

## 十二、不一致的代词与先行词

➤当代词代替不定先行词 **any, each, either, neither** 及 **person** 和以 **-one、-body** 及 **thing** (如 **everyone, anybody, something**) 结尾的词时，就必须使用单数代词。

➤若两个或两个以上的单数先行词用 **and** 相连接时，则应使用复数代词。

➤两个或两个以上单数先行词以 **or** 或 **not** 相连接时，则应使用单数代词。

➤若一个复数先行词与一个单数先行词以 **or** 或 **not** 相连接时，则应该使代词的数和与它最靠近的先行词的数保持一致。

原句: Any author who wishes to present a paper at the conference should submit an English

abstract of **his** paper before December 31,2001

修正句:

★Any author who wishes to present a paper at the conference should submit all English abstract **of his or her** paper before December 31, 2001.

★**Authors** who wish to present papers at the conference should submit the English abstracts of **their** papers before December 31,2001.

★Any author who wishes to present a paper at the conference should submit an English abstract of **the paper** before December 31,2001.

➤They, them 和 their 不能用来作为单数先行词的代词。也不应该以 his/her 或 he/she 这种书写形式来表达两个代词的合并使用。

误: **Any author** who wishes to present paper at the conference should submit an English abstract of **their** paper before December 31, 2001.

误: **Any author** who wishes to present a paper at the conference should submit an English abstract of **his/her** paper before December 31, 2001

➤指示形容词(this, that, these, those)的数必须与其所修饰的名词的数一致。特别是指示形容词后面跟着 kind of 或 type of 这类词组时, 应该与 kind of 或 type of 之后紧跟的名词的数相符。

误: This type of pens.

误: These kinds of circuit.

正: This type of switch.

正: These types of switches.

正: This kind of solvent.

正: These kinds of solvents.

### 十三、不正确或不自然的复合名词

复合名词是由两个或两个以上的名词有机地组合成的名词词组, 如 electronics engineer, figure caption, research team 等。

复合名词可以简洁地表达某些复杂的概念, 但是, 应该注意千万不要造出不自然的或不正确的复合名词。

为了确保所写的复合名词是读者易于理解的正确、清楚的表达形式, 在撰写科技论文时, 应该记住**复合名词使用的三个规则**: 只用规范的、结构合理的复合名词; 复合名词要简短; 不使用名词的所有格。

★差: In this paper we introduce a new *actuator location selection method*.

佳: In this paper we introduce *a new method for selecting the location of actuator*.

★差: Existing network bandwidth assignment methods are not suitable for this case.

佳: Existing *methods for* assigning bandwidth in net-works are not suitable for this case.

★误: This document is a government research institute technology development guidance model proposal.

正: This document proposes *a model for* guiding the development of technology at research institute operated by the government.

### 十四、不合理的比较

科技论文中常用到两个项目的比较, 但是要注意, 两个项目之间的比较一定要合理且完整, 而且两个项目本身是可以比较的相同类型的名词。此外, 必须把比较的项目陈述清楚, 以免读者不知所云。

★不合理: The *accuracy* of the new robot arm is greater than the conventional one.

合理: The *accuracy* of the new robot arm is greater than that of the conventional one

合理: The new robot arm is more accurate than the conventional one.

★不合理: These *results* are consistent with Smith et al.

合理: These *results* are consistent with that of Smith et al.

★不合理: The alignment *problem* is simpler in imperative languages than the functional language Alpha.

合理: The alignment problem is simpler in imperative languages than in the functional language Alpha.

★不清楚: Low-frequency noise is filtered out more effectively by the AGC than the limiter.

清楚: The AGC filtered out low frequency noise more effectively than the limiter does.

清楚: Low-frequency noise is filtered out more effectively by the AGC than by the limiter.

## 十五、关于主题与评论的句型

一般说来,一篇说明文或者一个结构完整的段落,通常都有一个概括全篇或全段中心思想的主题句。主题句通常出现在篇首或段落的前部。主题句一般有关键词,并通过关键字在结构形式上和意义上与辅助句紧密相连,从而体现出全篇或整个段落意义的连贯性和统一性。主题句的结构形式也有人称之为“主题与评论”的句型。

### 举例

在应用方面,已有许多模糊神经网络应用的报告。关于这个问题,采用了下面的解决方法。

不自然: In application aspects, many applications of fuzzy neural networks have been reported.

不自然: Concerning this problem, the following approach was adopted to solve it.

修正句: Many applications of fuzzy neural networks have been reported.

修正句: This problem was solved by adopting the following approach.

修正句: The following approach was adopted to solve this problem.

学生在撰写英文科技论文时,往往喜欢用 as far, as to, concerning, considering, for, in respect to, in the area of, regarding 等词作为开头的句子。但是,应该注意这些词开头的句子可能是不自然的“主题与评论”型的句子。针对这种情况,可以去除这类句子的句首短语,直接陈述句子的重点,使句子显得通顺、自然。

### 举例

★不自然: Regarding the effect of Rayleigh number on the wall temperature of the inner cylinder, it is illustrated in Figure 5.

修正句: Figure 5 illustrates the effect of Rayleigh number on the wall temperature of the inner cylinder.

修正句: The effect of Rayleigh number on the wall temperature of the inner cylinder is illustrated in Figure 5.

★不自然: Comparing the differences between Robert's approach and our approach, the main difference between them is that our method is much simpler to use.

修正句: The main difference between Robert's approach and ours is that our method is much simpler to use.

修正句: Our method is much simpler than Robert's approach.

★不自然: For each character image, it is identified as belonging to a set of m candidate characters.

修正句: Each character image is identified as belonging to a set of m candidate characters.

# 第 2 部分 科技英语翻译方法

## 第 1 章 概论

### 一、引言

►科技英语翻译的难点:

- ★英语的语法结构不是十分严密, 语言习惯和汉语有不少差别
- ★词汇和习语特别多, 较难正确地加以理解

►搞好科技英语翻译需要具备的条件:

- ★要真正掌握英语语法规律, 包括词法、句法和各种习惯用法
- ★要具有扎实的专业知识和相关专业常识, 了解基本概念
- ★要有比较高的汉语修养, 能够较为熟练地运用汉语的语法修辞手段来表达各种不同的概念

### 二、翻译的标准

#### 1. 文学作品的翻译标准: 忠实; 流畅; 优美

傅雷译《约翰·克里斯多夫》罗曼罗兰著

#### 2. 科技英语的翻译标准

►明确

★In order to minimize grain size as a variable in the polycrystalline specimens... 为使作为多晶试样的一个变量的晶粒度减至最小...

★There are crossed transverse steady and longitudinal alternating fields.

★Few quantitative data are available.

►通顺

选词造句和语气表达要正确。应当准确表达出原文的语气、情态、语态、时态和强调的重点内容。

语气: 肯定、否定、疑问、祈使和虚拟等;

情态: 能够、可以、应当、必须等;

语态: 主动、被动;

时态: 现在、将来、过去。 \_

#### 举例

★This possibility was supported to a limited extent in the tests.

- A. 在试验中这一可能性在有限的程度上被支持了。
- B. 试验结果在一定限度内证实了这一可能性。
- C. 这一可能性在试验中于一定限度内得到了证实。

★Commercial magnesium ingots were used as received except for acid pickling to remove surface oxide. 工业镁锭系在购进状态下使用, 只是要经过酸洗, 以去除表面氧化物。

►简练

The flow sheet shown in Fig.2 is intended to illustrate the SL/RN process.

图 2 中所示出的流程是想用来阐明 SL/RN 法的。

图 2 为阐明 SL/RN 法的流程

★为了明确, 可以适当地添加说明性的词语

★为了简练, 应尽可能扼要地概述原文含义, 采用简介的句子结构, 删除译文中的冗词。



### 三、翻译的规律

(1) 深刻地理解原文；(2) 确切地表述译文

#### ►深刻地理解原文

##### ★弄清楚语法关系

在科技英语翻译中，原则上应先以句子为单位，根据英语语法来分析句子的结构，**辨明**主语、谓语、宾语或表语、附加成分或修饰语(定语、状语或补足语)；**辨明句子的类型**，如果是并列复合句或主从复合句，要判明各个分句之间以及主句与从句之间的关系。必要时也需要联系上下文来分析和理解。

**问题：**初学者的翻译错误大多数是由于将句子中的并列关系或从属关系搞错而引起的。

##### 举 例

- ① No attempt has been made to separate the **effect of A and B**. 不曾试图区分开 A 的影响和 B 的影响。
- ② The engineering ceramics consist mainly of the so-called refractory oxides and the borides, carbides, nitrides and **silicides of many of the transition metals**. 工程陶瓷上要由所谓的耐热氧化物以及许多过渡金属的硼化物、碳化物、氮化物和硅化物组成的。

##### ★彻底辨明词义

- ③ The rate of dissociation was followed by placing the **unit** on a scale and noting the weight loss due to chlorine evolution. 离解速度曾通过下列方法求得：将设备放置在天平上并记录由于氯的放出而引起的重量损失。

➔**辨明词义的方法：**多查几本字典；要放在句子中去体会；要从技术内容去考虑

#### ►确切表达译文

##### ★准确选词

福楼拜(G Flaubert): “每一个物件只有一个名词可以称呼，每一个动作只有一个动词可以表达，每一个形态只有一个形容词可以描摹。”

**要做到选词准确应注意的问题：**

- (1) 要确切掌握词义
- (2) 要注意词的搭配

例如，Indicate, show 和 demonstrate 都有“指示、指出”的意思。它们的主语常常是 result、experiment、practice、figure 一类的无生物名词，但应该翻译为“结果表明”、“实验证明”和“图 x 表示(示出)”等。

- (3) 要照顾语言习惯

汉语的语言习惯和英语有很多差异之处。

例如, up cut shears”通常译作“下切式剪切机”；low temperature、high temperature 不能一律直译为“低温”和“高温”，有时可改译为“较低温度”和“较高温度”。

- (4) 要符合技术内容

在确定科技术语的译名时，必须使之确切符合该名词的技术含义。例如：tensile strength 通常译为抗拉强度，但不可因而推论 tensile properties 也应译为抗拉性能，应译成拉伸性能。

又如 cleaning 一词通常可译作清理和清整，但前者涉及物理、化学作用，后者仅与机械作用有关；有时它也可译作清除、清洗或净化。

必须根据具体情况，适当选用词义，以使其译法能确切表达有关的技术含义。

►避免歧义：重复或添加词语；适当使用连词

►力求简练

★Liquid helium containers with an inner shell of type 304 stainless steel are solving a problem in the long distance shipping of bulk quantities. 具有 304 不锈钢内衬的液体氦容器正在解决远距离



运输大量液体氢的问题。

★The most effective method of removing this acid contaminant is to cool and then neutralize the exhaust gases.

## 第2章 词语的顺序

### 一、主语词序的安排

需要注意的是主语的转换成宾语(当把被动语态译为主动语态时)时的词序和主语省略(当改译为无人称句时)的词序。

- ④ These results have been confirmed by the recent work of Zhile et al. Zhile 等人最近进行的工作已证实了这些(研究)结果。
- ④ It is easy to show that cast iron is more brittle than steel. 不难证明, 铸铁比钢脆。

### 二、宾语词序的安排

在下列情况下, 可将宾语提前

★出于修辞上的考虑 - 例如为了读起来顺口, 或和并列成分在结构上一致, 或避免产生歧义, 可利用汉语里的处置式, 借助“把”字或“将”字把宾语提到动词前面。

Not only does the rolling reduce the metal to the desired thickness, but it toughens the metal. 轧制不仅能将金属减薄到需要的厚度, 也能使金属的韧性增大。

★当宾语带有较多附加成分时, 为使译文简洁明朗, 也往往需要利用处置式结构将宾语提前。

例如: We must improve the high-temperature strength of this constructional material to a much higher level in order that it can be used to manufacture guided weapons. 我们必须把这种结构材料的高温强度提高到很高的水平, 以便能用它制造导弹。

★当宾语带有限制性定语从句时, 为了避免译文句子冗长, 可利用介词“对”或“对于”将宾语提到句首。

例如: A special lubrication oil must be used for engines **which are** operated with fuels, the sulphur content of which is more than 0.5% by weight. 对于使用硫含量大于 0.5%重量%的燃料(来操作)的发动机, 必须采用专门的润滑油。

★当宾语带有后置定语(特别是较长的定语)或宾语补足语时, 从汉语修辞考虑, 有时也可将宾语提前。

例如: Nuclear energy can be used to reform a hydrocarbon gas for direct reduction.  
核能可用来对烃气进行重整, 使适合直接还原之用。

### 三、定语词序的安排

一个名词有两个以上定语时在译文中的先后次序问题。

★两个以上单词修饰同一个名词时, 它们的位置顺序大体上最依循: 范围由小到大、由次要到重要、由程度较弱到程度较强, 由一般到专有。意思愈具体、物质性越强, 就靠靠近名词。

★短语定语, 一般放在所修饰名词之后; 如果有两个以上短语定语, 则所有格定语靠近所修饰名词, 而后是其他短语定语。

★原文由两个以上前置定语

- ④ programmed digital automatic control      自动数字程序控制
- ④ Theoretical maximum density      最大理论密度
- ④ precast concrete products      混凝土预制件
- ④ growing home and world market needs      国内外市场日益增长的需要

★同时有前置定语和后置定语

- ④ the theoretical amount of evaporation 理论(的)蒸发量
- ④ high concentration of dislocations 高的位错密度
- ④ the heat energy produced 所产生的热能
- ④ some typical package used for today's integrated circuits  
目前集成电路[使用]的某种典型封装
- ④ various impurities difficult to remove 各种难以除去的杂质

★较复杂的并列定语有时可根据汉语习惯完全打乱原来的顺序，重新排列。例如：

- ④ fewer but larger and more productive units  
生产率较高的少数大型设备

汉语中状语的顺序：时间状语→地点状语→方式状语→动词

汉语中的状语顺序与英文的相反，因此翻译时应将次序调整到汉语习惯。

- ④ The first official meeting of the new committee was held at the Sixth Congress of ICOLD in New York in 1958. 这个新成立的专门委员会的第一次正式会议是在1958年在纽约举行国际大坝委员会第六届大会期间召开的。
- ④ Similar improvements in both strength and toughness have been obtained in other low-alloy steels by warm working a variety of initial microstructures in the range of 500~600°C. 在其他一些低合金钢中，通过在500~600℃范围内对各种初始显微组织进行温加工，强度和韧性二者都已得到类似的提高。

## 四、从句的次序安排

英语中容易产生先后顺序问题的主要是状语从句，其中方式、比较、结果状语从句通常放在主句后面；时间、地点、原因、条件、目的、让步状语从句既可放在主句之后，也可放在主句之前，但一般多放在后面。

- ④ The engine stopped running because the fuel was finished.  
因为燃料用完，这台发动机停止运转了。
- ④ They will let you operate this new machine on condition that you follow the operating rules.  
只要你遵守操作规程，他们就让你操作这台新机器。

初搞翻译工作者，往往喜欢倒译，而不考虑具体情况这是不妥当的。根据英语和汉语的语言习惯和造句规则，在科技英语翻译中应当尽量采用顺译法。只有在顺译不能很好表达原文含义时才采用倒译法。

# 第3章 词性转换

## 第1节 词性的语法功用

英语里许多词的词性不是固定的，往往同一个词既可当名词，又可当动词，或则既可用作副词，又能用作介词…。有些词本来属于这一词性，在一定情况下，可以直接转换为另一词性。这些都属于词性转换。在翻译时，要注意那些具有较多词性的词在句中的具体词性和词性的转换，才能正确地理解原文。

### Round 的词性转化

- ④ The moon **rounds** the earth. 月亮围绕着地球转动。(动词：围绕着……转动)
- ④ The hour hand of a clock goes **right round** in twelve hours. 钟的时针每十二小时(正好)转一圈。(副词：一圈)
- ④ When used as the transmission medium, the **round** waveguide presents us with an

- opportunity to design a communication system of enormous capacity. (形容词: 圆形的)
- ② When direct current flows through a coil, a magnetic field will be built up **round** the coil.  
当直流电通过线圈时, 就会在线圈周围形成磁场。(介词: 在...周围)
- ② The news quickly went the **round** of the works. 这消息很快传遍了全厂。(名词: 四处)

## 一、名词的词性转换

### ➤名词用作形容词

- ② asbestos sheet 石棉板
- ② open hearth furnace 平炉
- ② radio beam station 定向无线电台
- ② wind-tunnel computer 风洞型计算机
- ② zero-sequence field impedance 零序磁场阻抗

### ➤名词用作副词

- ② The salt is **water** soluble.
- ② These constants are **temperature** dependent.
- ② IN-100 compressor turbine discs hot die forged from powder preforms reduce material input weight by 65 %-From 84kg to 29kg.
- ② The molybdenum powder can be **plasma flame** sprayed to produce tough, wear-resistant coatings on to many types of base material.
- ② **12 mm** thick steel plate.
- ② **Solid-state** reduced iron.

### ➤名词用作动词

- ② fire 火→to fire 点火
- ② heat 热量→to heat 加热
- ② sack 袋→to sack 装袋
- ② store 仓库→to store 储存
- ② surface 表面→to surface 浮到表面

## 二、形容词用作名词

### ➤英语里在形容词前面加定冠词 the, 可使其名词化, 以表示相应的人或事物。

- ② the upper and the lower 上部和下部
- ② the lightest of these alloys 这些合金中最轻的一种

### ➤有些形容词也已经完全转化成名词了。

- ② chemical 化学药品
- ② periodical 期刊
- ② mineral 矿物
- ② professional 专业人员

## 三、形容词用作动词

- ② dry 干燥的 → to dry 干燥, 烘干
- ② cool 凉爽的→to cool 使凉, 冷却
- ② clean 洁净的→to clean 清洗, 清理
- ② clear 清楚的→to clear 清除, 清算
- ② slow 缓慢的 →to slow 减慢, 变慢

## 四、动词用作名词

➤由动词转化成的名词，大多表示原来的动作、状态；有时也引伸来表示人或器物的名称。

run 进行, 运行, 行程      find 发现物  
move 运动, 推移, 措施      exhibit 展览品

➤短语动词也可转化成名词(转化合成词)，最常见的是由**动词+副词**转化成的名词。

break-down 折断, 破坏, 击穿  
hand-over 移交  
build-up 组装, 装配, 聚集, 堆焊

## 五、副词用作动词

个别副词有时可用作动词，表示动作的方向，或稍有引伸。

- ④ A high power plasma spray system *ups* the deposition rate. 高能等离子喷涂系统提高了(涂层)喷涂速度。
- ④ Any plane can be *downed* with a missile.  
任何飞机都能用导弹击落。

## 六、其他词性转换

➤形容词用作介词的情况

- ④ Unlike bromine and chlorine, iodine, by itself, does not directly replace a hydrogen atom attached to an aromatic ring. 与溴及氯不同，碘本身不能置换系于芳环的氢原子。(形容词 *unlike* 活用作介词)

➤名词用作形容词

- ④ the *above* review 上面的评论
- ④ in *after* years 后来
- ④ *up (down)* train 上行(下行)车

## 第 2 节 翻译时的词性转换

### 一、名词转化问题

➤名词转成动词单独的名词，即动名词、具有动作意义的抽象名词(行为名词)和由动词派生的名词可直接译为动词。

- ④ No other changes occur *upon mixing* the two compounds. 把这两种物质混合起来时没有发生其它变化。
- ④ *Reversing* the direction of the current reverses the direction of its lines of force. 倒转电流的方向也就倒转了它的磁力线的方向。
- ④ The tests indicate that a countercurrent *flow* of gases and solids is necessary in the reactor. 试验表明，使气体和固体在反应器内逆向**流动**是必要的。
- ④ Laser is one of the most sensational developments in recent years, because of its *applicability* to many fields of science and its *adaptability* to practical uses. 激光是近年来最轰动的科学成就之一，因为它可以**应用于**许多科学领域，也**适合**各种实际用途。
- ④ *With the use of* the increased temperature and pressure, the oil is cracked into lighter or heavier fractions. **利用**升温升压，可将石油裂化成轻馏分或重馏分。
- ④ He *had a good knowledge of* chemistry. 他**精通**化学。

➤名词转成形容词

- ④ This experiment is an absolute *necessity* in determining the best processing route. 对确定最佳工艺流程而言，这次实验是**绝对必需的**。
- ④ The *combination* of mechanical properties of this alloy can be well achieved by heat

treatment. 这种合金能通过热处理获得良好的**综合**机械性能。

- ④ Additional power is required for the reduction of the FeO **content** in the sponge iron. 需要额外的电力来还原海绵铁中**所含的**FeO。

#### ➤名词转成副词

- ④ **Most of** the metal ions produced during leaching are combined with sulfate as metal complexes or precipitates. 浸出过程中产生的金属离子**大都**和硫酸盐化合成金属络合物或沉淀物。
- ④ The discovery of rich petroleum resources in China is also inseparable from the oil-workers' **efforts** to “win honours”. 中国丰富石油资源的发现也是和石油工人的努力“**争气**”分不开的。

#### ➤形容词转成名词

- ④ The electrolytic process for producing hydrogen is not so **efficient** as the thermo-chemical process. 电解法生产氢的**效率**不象热化学法那样高。
- ④ In fission processes, the fission fragments are very **radioactive**. 在裂变过程中, 裂变碎片的**放射性**很强。
- ④ The reduction of the tap-to-tap time leads to **lower** radiation loss per heat. 两次相邻出钢的间隔时间的缩短可导致每炉钢辐射热损失的**降低**。

## 二、形容词转化问题

#### ➤由动词派生的形容词以及起形容词作用的现在分词及过去分词, 常可译成动词。

- ④ Also **present** in solids are numbers of free electrons. 固体中也**存在着**大量的自由电子。
- ④ Figure 13 shows the **rising** power consumption at **increasing** sponge iron rates. 图 13 表明, 当海绵铁配比**增大**时, 耗电量便**增高**。
- ④ Only a few years ago, most of the nonmagnetic fraction of a **shredded** car was disposed of in landfill areas after hand-picking to recovery some of the copper, zinc and aluminum. …(废)汽车**切碎**后的非磁性…。

#### ➤英语里表示感觉、欲望等心理状态的形容词同连系动词一起构成复合谓语时, 在翻译时可将动词略去, 而将该形容词译成动词。

- ④ Rontgen was **certain** that the fluorescent effect was not due to cathode rays. 伦琴**确信**, 荧光效应不是起因于阴极射线。
- ④ They are very **familiar** with the performance of this type of transistor amplifier. 他们十分**熟悉**这类晶体管放大器的性能。

#### ➤形容词转成副词

由于语言习惯不同, 英语里的形容词有时须译成汉语副词。

- ④ **Most** hardening steps employ some form of shaft furnace. 淬火操作**大多**使用某种形式的竖炉。
- ④ The **average** proportion of molybdenum in igneous rock is about 1.5 %. 钼在火成岩中所占的比例**平均**为 1.5% 左右。

#### ➤当英语名词译成汉语动词时, 修饰该名词的形容词自然就转译成副词了。

- ④ Transistors are fairly **recent** development. 晶体管是**最近**才发展起来的。

## 三、动词转化问题

#### ➤动词转成名词

- ④ The alloys of group I **softened** much more rapidly than the lower ThO<sub>2</sub> content alloys of group II during high temperature annealing. 在高温退火过程中, 第一组合金的**软化**比 ThO<sub>2</sub> 含量较低的第二组合金快得多。



- ☉ An electric current **varies** directly as the electromotive force and inversely as the resistance. 电流的**变化**与电动势成正比，与电阻成反比。
- ☉ Coating thicknesses **range** from one tenth mm to 2mm. 涂层厚度**范围**为 0.1~2mm。
- ☉ An electron or an atom **behaves** in some ways as though it were a group of waves. 电子和原子的**行为**，多少有点象一组波。

#### ➤动词转成形容词

- ☉ Tests showed that the cooling air must **flow** at a rate of at least 170m<sup>3</sup>/hr. 试验表明，冷却空气的**流动**速率至少须为 170m<sup>3</sup>/hr。

## 四、副词转化问题

#### ➤副转成名词

- ☉ Such details must be **dimensionally** correct. 这类零件的**尺寸**必须准确。
- ☉ Chlorine is very active **chemically**. 氯的化学特性很**活泼**。

#### ➤副词转成动词

副词 on、off、over、up、in、out、behind、forward 等，在一定情况下可译成汉语动词。

- ☉ The radio is **on**. 无线电在**广播**。
- ☉ This experiment is over. 实验**结束**了。

#### ➤副词转成形容词

- ☉ Nitric acid is an **extremely** reactive agent. 硝酸是一种**强烈**的反应剂。
- ☉ The wash water from the gas washer was **heavily** laden with solid particles. 从涤气器出来的洗涤水夹带有**大量**的固体微粒。
- ☉ The power station **here** supplies the electric power to the whole city. **这里**的发电厂供给全市的电力。
- ☉ Members of the group are not so **closely** related to each other as are the elements in the halogen family. 这一族中各元素之间的相互关系不象卤族元素那样**密切**。

# 第 4 章 名词、冠词和代词的翻译

## 第 1 节 名词的翻译

### 一、词义的选择与表达

#### ➤词义的选择

英语里一词多用和一词多义现象相当普遍，词义的选择就是从一词的许多含义中选定一个最适合的含义。

##### ★根据具体情况选定词义

- resistance to traction 牵引阻力
- resistance to sparking 击穿电阻
- resistance to heat 耐热性
- resistance to wear 耐磨性, 抗磨强度

##### ★根据上下文选取词义

- ☉ Either of two reactions may be in **effect** in the reduction of iron oxide with carbon. 在用碳还原氧化铁时，两种反应中的每一种都可能**发生**。
- ☉ Alloys belong to a half-way **house** between mixtures and compounds. 合金是介于混合物和化合物之间的中间**结构**。

##### ★根据技术内容选用词义



- ④ tensile properties 应译为“拉伸性能”，而不能译为“抗张性能”
- ④ mechanical working 有机械加工和压力加工二义，翻译时应根据技术内容选用。

## 二、词义的表达

### ➤照顾汉语的语言习惯

up cut shear 应译为下切式剪切机

low temperature 应译为较低温度

### ➤注意词义的引伸

- ④ The **foresight and coverage** shown by the inventor of the process are most commendable. 此方法的发明者所表现的**远见**和**广阔知识**给人以十分良好的印象。
- ④ There are three **steps** which must be taken before we graduate from the integrated circuit technology. 我们要完全掌握集成电路工艺，必须采取三项**措施**。
- ④ The major **contributors** in component technology have been in the semi-conductor components. 元件技术中起**主要作用**的是半导体元件。

### ➤考虑词性的转换

### ➤适当翻译名词的单复数

- ④ When the ends of a copper wire are joined to a device called an electric cell a steady stream of electricity flows through the wire. 当把一根铜丝的两端连接到一种叫做电池的电器上去时，就会有稳定的电流流过该铜丝。
- ④ Sensor switches are located near the end of each feed belt. 各传感器开关位于每条给料皮带末端附近
- ④ A data processor can issue address and function codes. 数据处理机能发出地址码和功能码。

### ➤保持名词的统一

英语里为了使文章生动有力，避免呆板和重复，对于同一事物，有时可以用几个不同词加以表示，在翻译科技英语时应统一。

- ④ While small **generators** frequently have revolving armatures, large **machines** usually have stationary armatures and revolving fields. 小型发电机常常采用旋转电枢，而大型发电机通常采用固定的电枢和旋转的磁场。
- ④ **Concentrated hydrochloric acid** is decomposed by electrolysis into hydrogen deposited at the cathode and chlorine deposited at the anode, and so **the acid** becomes dilute.

## 三、科技术语的翻译

### 1. 意译

意译就是根据科技术语的技术含义翻译成汉语里和它完全对等的名词。

air compressor 空气压缩机      digital computer 数字计算机

monophase 单相      unit process 单元作业      yield point 屈服点

### 2. 音译

Roentgen 伦琴    nylon 尼龙    quinine 奎宁    radar 雷达    coffee 咖啡    sonar 声纳  
trust 托拉斯    carbine 卡宾枪    konstantan 康铜(一种镍铜合金)    motorcycle 摩托车  
photovoltaic effect 光生伏打效应    alnico 阿尔尼科铁镍铝钴合金  
Hipernik 海波尼克(高磁导)铁镍合金    duralumin 杜拉铝, 硬铝

### 3. 象译

英语里有些科技术语的前半部分是表示该术语的形象的字母或单词，翻译成汉语时也把这一部分译成能表示具体形象的字眼，或保留原来的字母。

H-beam 工字梁      U-steel 槽钢, U 字钢      V-belt 三角皮带

cross bit 十字钻头      twist drill 麻花钻

#### 4. 形译

科技术语中有的包含着代表某种概念的外文字母，有的是商品名、型号、牌号或代号，这些一般可照原形抄下来，不予译出。这就叫做形译。

L-electron    L 层电子      X-ray      X 射线(伦琴射线)  
LIX-64N      (一种萃取剂)       $\alpha$ -brass       $\alpha$  黄铜(含锌 $\leq 38\%$ 的合金)

#### 5. 缩写词

翻译科技文献时，如遇到缩写词，一般须加以译出；否则就会妨碍读者的理解。英语里的缩写词的类型：

➤ 单词省写：即将一个单词后面的部分省略掉，而只留下开头的一个或几个字母。

➤ 单词简缩：即把一个单词的中间部分省略掉，而保留前后两头的一些字母。

➤ 词组缩写：即把由两三个单词组成的词组缩写为一个词。

➤ 词组首母组合：即取词组中各个单词的第一个字母组成一个缩写词。

- ☉ Circum. → circumference 圆周
- ☉ max. → maximum 最大值
- ☉ engng. → engineering 工程
- ☉ Instn. → Institution 学会；学院
- ☉ ampholyte → amphoteric electrolyte 两性电解质
- ☉ avionics → aviation electronics 航空电子学
- ☉ insullac → insulation acquer 绝缘漆
- ☉ I.M.M. → the Institution of Mining and Metallurgy (英国)矿冶学会
- ☉ ppm → parts per million 百万分之(几)
- ☉ rpm → revolution per minute 转/分
- ☉ MIT → Masachusette Institute of Technology

## 第2节 冠词的翻译

### 一、不定冠词的译法

1. 表示某一类事物中的任何一个，主要与分类上的概念有关，这时冠词可省略不译。

- ☉ This is a pyrometer. 这是高温计。
- ☉ He has become a engineer. 他当了工程师。

2. 表示某一类事物中的某一个，这时既有分类的含义，也有数量的概念，在第一次出现时，应予译出。

- ☉ There is an electronic microscope in our institute. 我们研究所有一台电子显微镜。

3. 表示数目，主要与数量概念有关，用来说明表示时间、距离、重量、数目、种类(包括量词)等的名词。这时必须译出。

- ☉ a minute 一分钟    a mile 一英里
- ☉ a kind of motor engine 一种汽车发动机
- ☉ a piece of paper 一张纸

4. 表示“同一”，需译出。

- ☉ They are working in a factory. 他们在(同)一家工厂里工作。

5. 表示每一个，可译为“每”。

- ☉ twice a day 每天两次
- ☉ forty miles an hour 每小时四十英里

### 二、定冠词的译法

定冠词 **the** 表示它后面的名词是指的某类事物中的某一个或某些特指的事物。

- 用以专指某一个或某些事物(或人), 以别于同类的其它事物(人)。可译为这(个)、那(个)、这些(那些)。
  - ☞ The machines have been well lubricated. 这些机器都已很好地加过润滑油了。
  - ☞ The physical form of the product is dependent to a degree on the drying /calcination temperature. 产品的物理形态在某种程度上取决于干燥和煅烧的温度。
  - ☞ The movement of electrons is called electric current. 电子的运动称作电流。
- 用于单数可数名词前面, 泛指一类事物; 这时 **the** 省略不译。
  - ☞ The atom is the smallest particle of an element. 原子是元素的最小的粒子。
  - ☞ The telephone was invented in 1876. 电话发明于 1876 年。
- 其后面的名词为世界上独一无二的事物或江河、海洋, 山脉、群岛以及报纸、杂志、机关团体等专用名词; 这时 **the** 省略不译。
  - ☞ the sun 太阳
  - ☞ the Atlantic Ocean 大西洋
  - ☞ the People's Daily 人民日报
  - ☞ the Physical Institute 物理学会
- 用于某些形容词之前, 使之名词化; 这时 **the** 不能省略。
  - ☞ the young 青年人 the poor 穷人
  - ☞ the oppressed 被压迫的人
- 用在重量、时间等名词前面, 表示单位, 这时 **the** 可译为“每”或省略不译。
  - ☞ This car travels twenty miles to the gallon. 这辆汽车每加仑汽油可行驶二十英里。
  - ☞ The telephone rate is calculated by the minute. 电话费是按分钟计算的。
- 用在形容词的最高级和序数词的前面。

### 第 3 节 代词的翻译

#### 一、代词分类及翻译方法

- 代词分类: 人称代词; 物主代词; 反身代词; 指示代词; 不定代词; 相互代词; 疑问代词; 连接代词。
- 四种译法: 照译; 还原; 互换; 省略

#### 二、人称代词和物主代词的译法

##### 1. 第一、二人称

科技文章中第一、二人称的人称代词和物主代词的译法主要有两种: 照译和省略。**We** 和 **You** 如果确实是指的我们和你(你们), 应当照译。如果是用作不定人称代词, 泛指一般的人, 则翻译时可予以省略, 即译为不定人称句。

- ☞ If we compress a gas it becomes hotter.  
如果压缩气体, 气体就热起来。
- ☞ Subtract four from sixteen and you will get twelve. 十六减四余十二。

##### 2. 第三人称

➤照译: 即仍译为代词。

➤还原: 即译为所代替的名词。

Air is not visible, but it is matter. 空气是看不见的, 但空气是物质 (将 it 还原为空气)

➤替代: 用这、这些…加以代替。

China is rich in antimony, tungsten, manganese, iron, etc. **They** are useful and necessary metals for heavy industry.

中国富有铋、钨、锰、铁等。这些都是重工业有用而必需的金属。

➤省略

When carbon burns it unites with oxygen from the air.

碳燃烧时同空气中的氧结合。

### 3. it 的译法

➤用作人称代词，代替无生命的事物(间或用来代替动物)；通常是代替在前面出现的单数名词，个别情况下(主要是在复合句中)也可代替后面的单数名词。这时可根据具体情况予以照译、还原或省略。

➤用作指示代词，起 this 或 that 的作用，可译为这、那或省略不译。

It is a grinder. 这是磨床。

It is eighty grams in mass. 质量是八十克。

➤用来表示时间、天气、距离等的非人称用法。

It is a quarter to ten. (现在)九点三刻

➤用作形式主语或形式宾语，代替逻辑上的真正的主语或宾语(移到后面去的不定式短语、动名词短语或名词性从句)。

It is very interesting to compare benzene with the cycle compounds which differ from it by only one or two pairs of hydrogen atoms. 比较苯和同苯只相差一、二对氢原子的环型化合物是很有意义的。(第一个 it 是形式主语，代替不定式短语；第二个 it 代替 benzene。)

➤用以构成强调句，以加强语气。

① It is these drawbacks which need to be eliminated and which have led to the search for new processes. 正因为有这些缺点需要加以消除，才(并)导致了对新方法的探求。

② It is here that the relative speed of throughput for the whole line is determined. 正是这里决定着整个作业线的相对生产速度。

③ It is this molecular motion that we call heat. 正是这种分子运动我们称之为热。

## 三、指示代词的译法

可以象名词那样用作主语、宾语或表语，也可以象形容词那样用作定语。

### 1. This, that; these, those

➤This 与 that 代替前面的单数名词；these 和 those 代替前面的复数名词。一般可分别译为这、那和这些、那些。

That is a modern chemical plant. 那是一座现代化的化工厂。

I have read all these. 这些我都看过了。

➤this 和 these 往往指时间和空间上较近的人或事物；that 和 those 指较远的人或事物。

① The two units used most frequently in electricity are ampere and volt: this is the unit of voltage and that of current flow. 电学上最常用的两个单位是安培和伏特：前者是电流单位，后者是电压单位。

➤That 和 those 常用来代替已出现的名词，借以避免重复(this 和 these 偶尔也有这种用法)。这时须还原为它的前词，或译成表示所有格的字结构。

② This is a review of the use of oxidation and reduction reactions and those involving changes in co-ordination states in neutralizations between acids and bases. 这是一篇关于氧化反应和还原反应以及引起酸碱中和时配位状态变化的反应的用途的综述(性文章)。

③ Conductors of electricity are of two kinds: 1) Those which conduct the current without undergoing chemical change; 2) those which are decomposed by the current. 导体可分二类：1)传导电流而不发生化学变化的；2)为电流所分解的。

➤This 和 that 可用来代替上文中提到的一句话或本句内的一个短语或句子形式(主句、分句或从句)；这时可予照译，也可省略不译或添加总括性说明词语。

② Iron combines easily with oxygen. **That's** why it is never found pure in nature. 铁很容易与氧化合, 这就是(为什么)从未在自然界发现过纯铁的缘故。

② Series circuits do have the advantage of increasing resistance to reduce current when **this** is desirable. 串联电路的确有这样的优点: 在需要时可以增加电阻来减小电流。

➤ This (these) 和 that(those) 也可用作**定语**, 修饰后面的名词, 这时除可照译外, 有时亦可译作该。

② It was at **this** time that steel linings for tunnels and shafts were first introduced. 正是在那个时候第一次在隧洞及竖井中采用了钢板内衬。

② Total replacement of coke by formcoke can be achieved on a blast furnace of modest size and driven at modest rates and **that** furnace permeabilities generally were satisfactory. 在中等尺寸和以适度焦比操作的高炉上能够全部用型焦代替焦炭, 并且**该**高炉的透气性通常是令人满意的。

## 2. Such 和 same

➤ 用作主语时 such 和 same 多半用来代替上文中提到的一件事(代替上面一句话), 这时 such 的译法类似于 this, 可译为**这或这件(这样的)事**; same 可译为**同样的或相同情况**。

② Such can be easily done at our factory. 这(件事)在我们厂里是易于做到的。

② The same can be said of the other article. 另一篇文章可说是同样的。

➤ **such** 用作宾语时, 是代替前面出现过的名词, 翻译时应还原为它的前词。**same** 用作宾语, 代替前面出现的名词时, 不能采用还原法, 可译为相同的情况、同样的东西等。

② The hypochlorites and hypochlorous acid are excellent bleaching agents and are used as **such** in the industries. 次氯酸盐和次氯酸是良好的漂白剂, 并在工业中用作漂白剂。(such 还原为所代替的**漂白剂**)

② We must check the conclusion by experiment; we should not blindly rely on **such** as was reached merely by calculations. 我们必须通过实验来校核这个结论; 我们不应盲目信赖过去仅靠计算得出的结论。(such 代 conclusion)

➤ **such** 用作**表语**时, 往往后面跟有以 that 作连词的结果状语从句, 这时 such that 有(是)这样的, 以致的意思。**same** 用作**表语**时, 可作为形容词看待, 译为**相同或相等**。

② The strength of this material is **such that** it can withstand heavy load under high temperature. 这种材料的强度(这样大)使得它能在高温下经受重荷

② To obtain desirable epitaxial layers the instrumentation must be **such that** parameters can be accurately controlled. 为了得到合乎要求的外延层, 测量控制设备必须(是这样的, 以致)能够精确控制各种参数。

② The ratio of the circumference to the length of any diameter is the **same** for all circles. 所有圆的周长与直径之比都相等。

## 四、不定代词的译法

### 1. any 和 some

➤ 都是表示**不确定数量**的代词, 可以用作主语、宾语, 也可用作定语。一般 any 多用于**疑问句**和**否定句**以及某些从句(但也可用于肯定句); 而 some 则大多用于**肯定句**。

➤ some 一般可译为**几个、一些**; 不涉及数量概念而作**某解**时, 可译为**某(个、一或些)**、**有些**; 指人时可译为**某些人、有些人**; 后面跟数字时, 可译为**大约**。

② You may call any day you please. 你随便哪天来都可以。

② We have carried out some tests in determining the carbon content by the new method. 我们已进行几次用新方法测定碳含量的试验。

② I will give you some information about this topic. 我将向你提供一些关于这项课题的资料。



- ☞ This problem has discussed in some book. 这个问题曾在某一本书上讨论过。
- ☞ Some machines have been out of use. 有些机器已经报废了。
- ☞ Some of the students are designing a new-type furnace. 某些学生在设计一种新式的炉子。

➤在否定句中，用在否定词后面的 any 表示全部否定，some 表示部分否定。

- ☞ They have not learned any of these rules of electricity. 这些电学定则他们一个也没有学过。
- ☞ The value of constant K does not change with any (some) factors.  
常数 K 值不随任何(某)因数而变。

➤any 可用于形容词之前，起副词的作用。

- ☞ Are you any good at chemistry? 你长于化学吗?

## 2. every、each

➤Every 指同类事物的全体，暗含全部、一切的意思；each 指同类事物的个体，可译为各或每。都只能表示单数。

➤Every 后跟数词时可译为每(隔)、每过。

➤Every 后面有 not 时，表示部分否定。

- ☞ Evenly substance has its use. 每一种物质都有它的用途。(即一切物质都有用)
- ☞ Each of the processes has its advantages and disadvantages. 这些方法备有优缺点。(每一种方法各有它自己的优缺点)
- ☞ Every machine here is not produced in our plant. 这里的(每台)机器不全是我厂产品。

## 3. all、both

➤all 指三个以上的人或事物，也可指不可数事物的全部；both 指两个人或两件事物。All 或 both 同 not 一起使用时，表示部分否定，not 可放在前面，也可放在后面。

- We both participated in the experimental work. 我们俩都参加了这项实验工作。
- Not all metals are good conductors. 并非所有金属都是良导体。(有的是，有的不是。)
- Both the balances are not precision. 这两架天平并不都是精密的。(一架精密，一架不精密)。

## 4. other、another

➤other 意为别的、其他，可以指两个人或两件事物中的另一个，也可指多数人或多事物中的其他一些。

➤another 之前要用冠词 the。Another 指别的、另外一个，往往是不定数目中的另一个(指的是与某一个或某一些不同的另一个)；再一个、又一个(后面可跟复数名词，但系把该名词看作一个整体)；并列的一个，与 one 连用，译为“一个…，一个…”。

- ☞ A bridge extends from one side of the river to **the other**.
- ☞ some atomic nuclei undergo spontaneous disintegration while **others** do not.  
有的原子核会自发裂变，而另外一些却不会。
- ☞ **Another** use of blast furnaces is to manufacture ferro-manganese.  
高炉的另一个用途是炼制锰铁。
- ☞ There are two spectrometers in our laboratory, one of them is not very good, **another** is accurate enough. 我们的实验里有两台分光计，其中一台不太好，(另)一台十分精确。

## 5. either、neither

➤either 表示两个中间的任何一個，neither 表示两个中间一个也不是。

★You may use either machine. (两台机器中)你可以使用任何一台机器。

★Either of the (two) rays is harmful to the body. 两种射线对人体都有害。

★According to the atomic weight, they are ionium and thorium. Neither atomic weight is a whole number. 按照原子量它们是镭和钍。它们两个的原子量哪一个也不是整数。(或这两种原子量都不是整数)

★Neither of the lathes can be used for machining such parts. 两台车床都不能用来加工这种零件。



# 第5章 数词、形容词与副词的翻译

## 第1节 数词

- (a) *teens of...* 十几(13~19)  
*tens of...*  
*decades of...* } 数十(几十)  
*dozens of...* 几十(几打)  
*scores of...* 几十(四十以上)  
*hundreds of...* 几百  
*thousands of...* 几千  
*tens of thousands of...* 数万(几万)  
*hundreds of thousands of...* 数十万(几十万)  
*tens of millions of...* 数千万(几千万)  
*a hundred and one...*  
*a thousand and one...* } 无数的, 许多的  
*millions of...* 千千万万, 千[百]万, 成千成万, 亿万  
*ten to one*  
*twenty to one* } 十之八九, 十有八九(插入语)  
*the seventies* 七十年代  
*the early 1980's* 二十世纪八十年代初期  
*up to 2.5 vol.%*  $\leq 2.5$  体积%
- (b) 数字后加“odd”或“and odd”:  
*twenty [and] odd*  
*twenty-odd* } 二十几, 二十有余  
*four hundred [and] odd* 四百多
- (c) 数字前加“more than”、“over”或“above”:  
*more than thirty*  
*over 30*  
*above 30* } 三十多, 三十以上, 高于30  
*more than one* 二(两种)以上, 多于一[个]
- (d) 数字前加“less than”、“under”、“below”:  
*less than forty*  
*under 40*  
*below 40* } 四十以下, 不到四十, 低于40

(e) 数字前加“some”、“about”:

*some fifty pounds* } 大约五十磅, 五十磅左右  
*about 50 lbs* }

(f) 数字后加“or so”、“or more”、“or less”、“more or less”:

*sixty grams or so* 六十克左右(上下)  
*sixty grams or more* 六十克以上(60克或更多些)  
*sixty grams or less* 六十克以下(60克或少一些)  
*one per second or less* 每秒钟一次以下(每秒一次或不到一次)  
*two hours more or less* 两小时左右

注: 1. “more or less”也可放在数词前, 意义不变。

2. 在数词后面单独使用“more”或“less”时, 表示确定的数量。

如:

*15 more* 再(加)15

*five more days* 再五天

(g) 利用介词“to”和“between”表示数量范围:

*seventy to eighty* } 七、八十, [从]七十到八十,  
*from seventy to eighty* } 70—80

*between seventy and eight* 七十到八十, 介于七十和八十之间

(h) 利用“upwards of”、“close to”、“approximate to”、“of the order of”、“order of magnitude” “within a factor of ten”等短语:

*upwards of 80 years* 八十多年

*close to a hundred* 近一百

*approximate to a thousand* 近千, 约一千

*of the order of 5 per cent* 大约 5%

*three orders of magnitude* 三个数量级

*within a factor of ten* 在一个数量级的范围内

## 一、表示数量增加的方法

1. 用带有增大意义的动词 (increase, rise, grow, go up) 和下列包含有数词 n 的词语相配合。

➤ [by] n + 单位: 表示净增量, n 可照译

The output went up 56000 tons. 产量增长了 56000 吨。

The production has increased 36%. 产量已增加了 36%。

★ **by+n times (by n%)**: 表示净增的倍数。

The steel output has increased by two times (by twice). 钢产量已增加了两倍。

➤ **n times, n folds, n 00%**: 表示呈 n 倍地增加, 可译为“增加到 n 倍或增加了(n-1)倍”。

② In 1975, the output value of Shanghai's heavy industry multiplied 18 times **against** 1949. 1975 年与 1949 年相比, 上海重工业产值增长了 17 倍。(或上海 1975 年重工业产值为 1949 年的 18 倍。)

② By 1980 the production of primary copper by leaching would be expected to increase five-fold. 到 1980 年, 用浸出法生产的原铜的产量预料会增长四倍。(增加到五倍)

- **by a factor of n**: 表示增加到 n 倍, 应译为“增加了(n-1)倍”。
- ② The speed exceeded the average speed by a factor of 3.2. 该速度超过平均速度 2.2 倍。
  - ② The production of machine tools has been increased by a factor of 6 since 1965.  
1965 年以来机床产量增加了 5 倍。
2. 用连系动词(或及物动词)和下列包含有数词 n 的词语相配合。
- [by] n + 形容词、副词比较级(more, larger, longer, broader, heavier, faster 等): 表示净增的数字, 可译为“比…大 (长, 宽…)n”。
- ② A is by 10mm longer than B. A 比 B 长 10mm。
  - ② This wheel turns 300rpm faster than that. 这个轮子转动得比那个轮快 300rpm。
- n times (n-folds) + 比较级 + than: 表示增加到 n 倍, 可译为比…大 (长, 宽…) n-1 倍(是…的 n-1 倍)。
- ② This capacity was two to three times greater than silica gel treated at 600K. 此容量比在 600K 下处理过的硅胶的容量大 1~2 倍。
  - ② Chromium masks last 10 to 100 times longer than the emulsion masks. 铬掩模的使用寿命为乳胶掩模的 10~100 倍。
- n times as+形容词或副词(much, high, great, heavy, fast…)+as: 表示是…的 n 倍 (增加 n-1 倍)
- ② A is twice (two times) as heavy as B. A 的重量为 B 的两倍。(或 A 比 B 重 1 倍。)
  - ② This substance reacts three times as fast as that one. 这种物质的反应速度是那种物质的 3 倍。(前者比后者快 2 倍)
- n times …: 表示是…的 n 倍或 n 倍于…
- ② The energy density of the spot **was 100 times** the typical saturation level of the vidicons. 光点的能量密度为光导摄像管典型饱和电平的 100 倍。
  - ② To avoid excessive transmission distortion, the bandwidth between transmitter and receiver must **be at least twice that** with digital carrier modulation. 为了避免过度的传输失真, 发射机与接收机之间的带宽至少要两倍于数字载波调制的带宽。
- as+形容词或副词+again as(或将 again 提到前面), 表示比…大(长、宽…)一倍(即净增一倍)
- ② This wire is **as long again as** that. 这根金属线的度为那根的两倍。(这根比那根长一倍)
  - ② This wire **is half again as long** as that. 这根金属线的长度是那根的一倍半。(这根比那根长 50%)
  - ② Wheel A turns **as fast again as** wheel B. A 轮转动得比 B 轮快一倍。
- an increase of n (n%)或 a n% increase: 表示净增的数量或百分数, n 可照译。
- ② There is **an increase of** 4.5 million tons of steel as compared with last year. 钢产量比去年增加了 450 万吨。
  - ② There is **a 20% increase** of steel as compared with last year. 钢产量比去年增加了 20%。
- a n times (n-fold) increase: 表示增加到 n 倍, 可译为增加了 n-1 倍。
- ② The composites showed **a two-fold increase** in modulus of elasticity and a five-fold increase in tensile strength over that of the plain matrix. 这些复合材料的弹性模数比单纯基体材料增大了一倍, 而抗张强度则增大了四倍。
  - ② In 1974 there was **a ten times increase** of China's coal output as compared with 1949. 中国 1974 年的煤产量为 1949 年的十倍。
- to n times: 表示增加到 n 倍, 也可译为增加了 n-1 倍。
- ② The liquor was diluted with water to five times its original volume. 溶液用水稀释到其原来体积的五倍
  - ② The gross agricultural output for 1973 grew up to three times that for 1949. 1973 年农业总产值增长到 1949 年的三倍。(比 1949 年增长了两倍)
- 用 double、treble、quadruple 等字作动词表示增加到的倍数。

- ④ In order to discharge about 2m<sup>3</sup>/s of spring-water, the area of this tunnel had to be doubled.  
为了排泄大约 2 立方米/秒的泉水, 必须把这条隧道的面积扩大一倍。
- ④ In 1972, Wuhan' output of heavy machines trebled as compared with 1962. 1972 年武汉重型机械产量比 1962 年增长了两倍。

►其它类似的表示方法

- go up half over…… 比……增加一半 (50%)
- increase by n powers of ten 增加 10<sup>n</sup> 倍
- n times m n×m (m 的 n 倍)
- n times as much… the same 是…的 n 倍
- be n% above 比……[增]高 n%

## 二、关于减少量的译法

大体上“成 n 倍地减少”可改译为“减少到 1/n” (当 n 为整数时)或“减少了(n-1)/n” (当 n≤10 时)。而“减少了 n 倍”则应改译为“减少到去 1/(n+1)”或“减少了 n/(n+1)” (当 n≤9 时)。

1. 净增量: 所减的数字可以照译。

- ④ decrease by 10 减去 10
- ④ reduce by 20% 减少 20%
- ④ fall by 30% 下降 30%
- ④ lower by 50% 降低 50%
- ④ 25% less 少 25%
- ④ 100 decreased by 10 is 90. 100-10=90
- ④ The loss of metal was reduced by 40%. 金属损耗减少了 40%。
- ④ X is six less than Y. X 比 Y 小 6。
- ④ This process used 22 percent less fuel. 此法少用了 22% 的燃料。

2. 成 n 倍地减少

即减少前的数量是减少后数量的 n 倍(减少到 1/n), 可译为减少到去 1/n 或减少了(n-1)/n。

- ④ decrease 2 times. 减少到 1/2(或减少了 1/2)
- ④ shorten 12 times. 缩减到 1/12
- ④ reduce by a factor of 2.5. 减少到 2/5(减少了 3/5)
- ④ a six-fold difference. 相差五倍
- ④ ten times as light as… 比……轻十分之九
- ④ The operating cost decreased three times. 操作费用减少了三分之二(减少到三分之一)。
- ④ The equipment under development will reduce the error probability by a factor of 7.  
正在研制的设备将使误差概率减小到 1/7。
- ④ The principal advantage over the dual filter coherent detection is a five-fold reduction in bandwidth.  
与双滤波器相干检波相比的主要优点是带宽减小了五分之四。(减小到五分之一)
- ④ The data in Fig.3 show a nearly three-fold difference in the highest values.  
图 3 的数据表明, 各最大值几乎相差二倍。
- ④ The mass of an electron is 1/1850 that of a hydrogen atom.  
电子质量为氢原子质量的 1/1850。

3. 减少一半

- ④ decrease one-half 减去一半
- ④ reducing… by one-half 减小一半
- ④ cut… in half 把……减少一半

- ④ shorten...two times 缩短一半
- ④ Halving... 把……减小一半
- ④ one-half less 少一半, 小一半
- ④ be less than half 少一半还多
- ④ **Reducing** the data rate **by one-half** will double the **duration** of each symbol **interval**.  
把数据率减小一半,将会使每一符号间隔时间延长一倍。
- ④ Switching time of the new-type transistor **is shortened 2 times**.  
新型晶体管的开关时间缩短了一半。

4.减少了  $n$  倍, 即减少前的数量比减少后的数量大  $n$  倍, 译为“减少了  $n/(n+1)$ ”或“为…的  $1/(n+1)$ ”

- ④ 4 time less (shorter, lighter) 少(短, 轻) $4/5$
- ④ twice less 少(小) $2/3$
- ④ twice thinner (厚度)减薄了  $2/3$
- ④ This one is nine times lighter than that one. 这一个比那一个轻十分之九。
- ④ A is twice less than B. A 是 B 的三分之一 (A 比 B 小  $2/3$ )
- ④ This kind of film is **twice thinner** than ordinary paper. 这种薄膜的厚度只及普通纸的  $1/3$ 。
- ④ The total enthalpy of the gas to be cooled would also be three to four times smaller.  
待冷却气体的总热焓也会减小到原来的  $1/5 \sim 1/4$ 。

5. 减余量, 即减少后剩余的数量, 通常用介词 **to** 和数词  $n$  来表示。

- ④ decrease to 50 减小到 50
- ④ reduce to 60% 减少到 60%
- ④ cut...to 70% 降低到 70%
- ④ The loss of metal was reduced to 15%. 金属损耗降低到 15%。
- ④ The new antenna system uses a retarded wave principle that cuts antenna light to 40%. 新的天线系统采用了延迟波原理, 使天线高度降低到 40%。

### 三、序数词的译法

1. 表示时间或空间上的顺序

- ④ nineteen seventy's (=1970's) 二十世纪七十年代
- ④ a third time 第三次
- ④ the first plants 头一批工厂

2. “ $n$ -th”表示分数

- ④ two thirds 三分之二( $2/3$ )
- ④ one hundredth 百分之一(1%)
- ④ a few millionths of a second 百万分之几秒
- ④ one-second power  $1/2$  幂
- ④ By operating at high current densities, the cost of the electrowinning plant may be reduced by as much as one-third.  
由于在高的电流密度下操作,电积装置的费用可减少三分之一(之多)。

## 第2节 形容词的译法

►语法功用: 用作**定语**、**表语**、**补足语**; 名词化的形容词还可用作**主语**和**宾语**。

►词语位置: 用作**定语**的形容词一般放在它所修饰的名词的前面, 称之为**前置形容词**; 在特定情况下也可放在所修饰名词的后面, 称之为**后置形容词**。这两类形容词的译法是不大相同的。用作**表语**或**补足语**时的译法又另属一类。

## 一、形容词的一般译法

### 1. 照译为形容词

绝大多数前置形容词和一部分后置形容词可以照译为形容词，构成所修饰的名词的附加语。

- ① It is a hard and brittle material. 这是一种硬而脆的材料。
- ② One of these bottle-shaped towers, 250ft. high and 170 ft. across, can cool 3 million gallons of water an hour.  
这些 250 英尺高、170 英尺直径的瓶形冷却塔，每一座每小时能冷却 300 万加仑的水。

### 2. 改译为名词

有些形容词可加定冠词 **the** 转化成名词。一部分比较级形容词也有此用法。这种名词化的形容词可用作主语或宾语，应译为名词。

- ① In capitalist countries **the poor** are exploited by **the rich**.  
在资本主义国家里穷人受富人剥削
- ② **The new** and progressive triumphs over **the old** and obsolete.  
新兴进步的事物战胜陈旧腐朽的事物。

### 3. 改译为动词

用作表语的形容词、用作后置定语的形容词、由副词转化的形容词，常改译成动词。

- ① In every chemical change the weight of the materials taking part in the change is exactly **equal** to the weight of the substances produced by the change. 在每一个化学变化中参加变化的物质的重量正好等于由变化所产生的物质的重量。
- ② The method is **free** from interference by other volatile material or organic matter. 此法免除了(不受)其他挥发物或有机物的干扰。
- ③ The test instrument is joined to the circuit with all the switches **off** so that no current should flow. 将测试仪器连接到电路上并关断所有的开关，使电流不致通过。

### 4. 改译为副词

- ① **For efficient, safe and smoke-free** operation, the distribution, quantity, temperature and velocity of the secondary air must be adequate to insure proper mixing and temperature.  
为了有效、安全而无烟地操作，二次空气的分布、数量、温度和速度必须足以保证适当的混合和温度。
- ② Hydrostatic billet extrusion is also finding commercial application for processing **difficult to form** materials where products of relatively short length are required.  
坯料的流体静力挤压法也正在把难成形材料加工成较短产品方面找到工业上的应用
- ③ Heat of reaction **ample to maintain reaction** can be evolved during smelting sulfide copper concentrates. 在熔炼硫化铜精矿时能放出(充分多的)足以维持反应的反应热 (ample 是 heat of reaction 的定语，to maintain reaction 是 ample 的补足语。)
- ④ It is **prudent** to make sure that there are no short circuits. 要谨慎地查明确无短路。

## 二、前置形容词的译法

- ① bituminous pavement 沥青路面
- ② thermal efficiency 热效率
- ③ initial current 起始电流
- ④ instantaneous speed 瞬时速度
- ⑤ compressive force 压力
- ⑥ down stream 下游
- ⑦ electric cooker 电灶
- ⑧ milling machine 铣



- ☉ Titanium is a **light, strong** and **corrosion-resistant** metal.

钛是一种轻量、坚固而耐蚀的金属。

➤一个名词前面有两个定语，其中前一个是形容词，后一个是名词时，该形容词是修饰哪一个名词，须根据具体情况加判明，才能正确地进行翻译。

Lubricants of low viscosity also exhibit a **low temperature dependence** of viscosity.

低粘度润滑剂也表明其粘度对温度的依赖性不大。(形容词 low 和名词 temperature 都是修饰 dependence 的，直译时为“粘度的低的温度依赖性”。如果误认为 low 修饰 temperature，那就会错译为“低粘度润滑剂也显示了粘度的低温依赖性。”)

### 三、后置形容词的译法

后置定语有三种类型：

➤所修饰名词前有限制性较强的定语(all, every, only 等以及形容词最高级)时，某些形容词常需放在该名词的后面。

- ☉ The only data **available** were obtained from abroad.

仅有的(可以利用的)资料是从国外得到的。

- ☉ They have tried all means **imaginable**.

他们已试验了一切可能想到的办法。(或：他们已经想尽了办法。)

➤所修饰的词由 some, any, every 等词派生出来的名词(something, anything, everything 等)时，形容词要放在该名词的后面。当谓语动词为连系动词时，也可将该形容词译为动词。

- ☉ It is evident that there is something **wrong** with the television set.

显然是电视机出了(什么)毛病。(wrong 译成动词)

- ☉ We will do **everything possible** to help him. 我们将要尽一切努力去帮助他。(possible 与 every 合并译为形容词“一切”)。

➤形容词本身带有修饰语，构成一个相当于定语从句的形容词短语时，该形容词一般需放在所修饰名词的后面。这时可译为形容词或动词。

- ☉ Electrons are very much smaller still, but they carry a negative electric charge **large for their size**. 电子还要小得多，但它们都带有对它们的体积来说是大的负电荷。(相当于 large 之前省去了 which is)。

- ☉ We have time **enough** to read the reference books.

我们有足够时间阅读参考书。(相当于 enough 之前省去了 which is)

- ☉ Aluminum may be rolled into foils so **thin** that they are almost transparent.

铝可以轧制成薄到几乎透明的箔片(相当于 foils 之后省去了 which are)

## 第3节 副词的翻译

在各类副词中，**时间副词**(now, today 等)、**地点副词**(here, everywhere 等)、**程度副词**(very, quite 等)和**疑问副词**(how, when 等)以及大部分**语气副词**(surely, indeed 等)，一般可照译为副词，并且根本无需添加汉语副词词尾“地”字。

如果考虑到由于副词在句中所处位置的不同或和句中其他成分的搭配而引起的变化，则某些程度副词和语气副词的译法也不是很简单的。

### 一、副词的七种译法

➤添加词尾“地”字

This problem should be **carefully** examined. 这个问题应当仔细地加以研究。

➤添加“上”字或“下”字(适合于大多数方式副词)

substantially 本质上，大体上

technically 技术上

normally 在正常情况下

typically 在标准情况下

➤添加“用”字或“用…方法”

★They may be identified **analytically**. 它们可用分析方法加以鉴定。

★Alloy powders were **ultrasonically** dispersed in **amylacetate**.

将合金粉末用超声波分散在醋酸戊酯中

➤不能采用前三种译法时需用引伸译法

★The nature of locally available clay material **largely** governs the quality of the final mix.

当地可用的粘土原料的性质在很大程度上决定着最终混合泥料的质量。

★**Specifically**, the estimates call for 11 million tons of prereduced materials to be consumed worldwide in 1975. 具体地说, 估计在 1975 年全世界将耗用 1 100 万吨预还原矿石。

➤改译法。在一定情况下, 副词可改译成动词、形容词或名词。

When anyone standing on the ground touches the vehicle which has collected a static charge during a thunderstorm, he may feel its electric charge flow through his body and away into the earth.

➤照译。即直接按副词的字面意义译出。大多数副词, 特别是时间、地点、程度、疑问副词, 都可照译。

➤省略法。在特定情况下, 副词还可以省略不译。

☉ Normally aluminum foil is hygienic, non-toxic, and an unsuitable medium for bacteria to breed on. 铝箔通常是卫生的、无毒的, 并且是一种不适合细菌(在其上)繁殖的介质(副词 on 可省略不译)

## 第 4 节 比较词语的译法

1. 形容词或副词比较级+than, 一般可译为“A 比 B……”

☉ The properties of steel are better than those of pig iron. 钢的性能比生铁(的性能)好。

☉ It is easier for antimony and bismuth to lose five electrons than to gain three electrons. 对锑和铋而言, 失去 5 个电子要比获得 3 个电子容易一些。

☉ The furnace used had a hot zone **uniform** to better than  $\pm 5^{\circ}\text{C}$  over 12cm at the straining temperatures from 900 to 960  $^{\circ}\text{C}$ . 所用的炉子具有均匀的热区, (其均匀程度达到)于 900~960  $^{\circ}\text{C}$  的变形温度下在 12 厘米长度上的温度差不大于  $\pm 5^{\circ}\text{C}$ 。

☉ This difference is **more apparent** than **real** and is due **mainly** to the fact that fluorine is itself far more **active** than the other halogens and that its compounds are much more **stable**. 这种差别更多是表面上的而非实际的, 并且主要是由于(这一事实, 即)氟本身比其他卤素远为活泼, 而其化合物则稳定得多。

☉ Sound travels **less last** than light. 声音没有光传播得快。

☉ Diamond is **still (even) harder** than steel. 金刚石比钢更硬。

2. 程度状语+比较级(+than)

所使用的程度状语包括 much, far, considerably, significantly, substantially, very much, a little, a bit, a great deal, a lot, slightly, 等。

☉ Very pure copper is needed for the wires used in electrical engineering, because quite small amounts of some impurities make copper a much poorer conductor of electricity. 电工中应用的导线需要很纯的铜(来制造), 因为相当少量的某种杂质就会使铜成为差得多的导体。

☉ This example shows clearly that **very much less** power is wasted in the wires **when** higher voltage is used. 这个例子清楚地表明, 当使用较高电压时, 线路中浪费的电力少得多。

☉ According to the Austrian School, the technological properties of a rock mass depend **far**

**more** on the system of geological separations within **the** mass **than** on the strength of the rock material itself. 按照(岩石力学方面的)奥地利学派的观点, 岩体的工程特性对岩体内地质断裂体系的依赖性比对岩石材料本身强度的依赖性大得多。

- ④ Compared with conventional design, the volume of gases handled and cleaned would be **much less**, about **three to four times less**.

和常规设计相比, 所处理和净化的废气量要少得多, 大约少  $\frac{3}{4}$  到  $\frac{4}{5}$ 。

- ④ Electric devices are **much more interesting** to use when you know **just** how they work. 当你确实知道电气设备怎样工作时, 用起来就有趣得多。(to use 是用作表语补足语的不定式)

- ④ For refrigerators and for air conditioning units, it is **far superior to** ammonia, sulfur dioxide and ethyl chloride **in that** it is practically odorless, non-toxic, non-in-flammable and non-corrosive.

对于冷冻机和空调设备而言, 它(二氟二氯甲烷)比氨、二氧化硫和氯乙烷远为优越, 因为它实际上是无臭、无毒、不燃并且无腐蚀性的。(superior to, inferior to 等本身就是比较级)

- ④ **Much less** is known about the state of development of ferric chloride leaching processes. 关于氯化铁浸出法的发展现状知道得很少 (less 转化为名词, 用作主语)

### 3. as (not so)+原级形容词或副词+as

表示被比较的双方在性质、程度和数量上相同。后面一个 as 引出一个完整的或省略了一些成分的比较状语从句, 表示比较的对象。一般可译为“和…一样…”或“像…那样…”

- ④ Electricity finds **as much** work to do in the country **as** it does in the towns. 电在乡村中的用途和(它在)城市中(的用途)一样多。
- ④ A large power station may produce **as much as** 500 tons of ash each day, the disposing of **which** is often a difficult problem. 一座大型发电厂每天能产生多达 500 吨的煤灰, 这些煤灰的处置常常是个难题。
- ④ Aluminium is very light in weight (specific weight 2.7), being only one-third **as heavy as** iron and is an excellent conductor of both heat and electricity. 铝的重量很轻(比重为 2.7), 仅为铁的重量的  $\frac{1}{3}$ , 并且铝既是优良的导热体, 也是优良的导电体。
- ④ Nearly five hundred such coatings of gold would be needed to be **as thick as** the paper in this book. 几乎需要五百层这样的金镀层, 才和这本书的纸张一样厚。
- ④ The molecules of liquids do not move **as actively as** those of gases. 液体分子的运动不象气体分子(的运动)那样激烈。
- ④ It **is not so much as** that chemistry is going out of the analytical chemistry, but that physics is going in. 与其说是化学正在脱离分析化学, 不如说是物理学正在介入分析化学中。

### 4. the+比较级…, the+比较级…。一般可译为“越…, 越…”。

- ④ **The stronger** the current (is), **the stronger** the attraction (is) and the more the pointer moves. (流过安培计的)电流愈强, 则引力就愈强, 因而指针移动的距离也就愈大
- ④ The wires have some electrical resistance, and **the larger** the current they have to carry, **the more** power will be wasted in overcoming this resistance. 导线具有一定的电阻, 因而该导线所要输送的电流越大, 则克服电阻所耗费的电力就越多。
- ④ **The more** stable the complex, **the lower** the pH required to cause its essentially complete dissociation. 络合物愈稳定, 则使它基本上完全离解所需要的 pH 值也愈低。

### 5. 形容词或副词最高级

➤最高级是用来表示事物的某种性质在某一可比范围内处于极点(最高、最低、最大、最小等)的地位。因此常须利用介词短语(of…、in…等)或定语从句来限定比较的范围。

➤最高级形容词前面一般须有定冠词 the; 但当前面有物主代词或名词所有格或则用作表语时,

可不加 the。

➤最高级副词前一般不加 the。

➤在最高级形容词前面还可使用表示程度或顺序的修饰语，如 by far, next, but one 等。

★Of all elements hydrogen is the **lightest** one. 在所有元素中，氢是最轻的。

★Lanthanum/cobalt oxide(LaCoO<sub>3</sub>) is **the most promising of** rare earth catalysts: it approaches platinum *in* efficiency but is considerably cheaper.

镧-钴氧化物(LaCoO<sub>3</sub>)是稀土催化剂中最有希望的一种：其效率接近于铂，但却便宜得多。

★**By far the largest** number of the stars we see through a powerful telescope are in the Milky Way System. 用高倍望远镜能观察到的恒星，绝大多数在银河系。

★Light travels **fastest** of all matter. 一切物质中光运动得最快。

★Copper in the form of wire, bars, etc. is **the most** commonly used conductor of electricity.

线材、条材等 形状的铜是最常用的导电体。

## 第 6 章 动词的翻译

### 第 1 节 谓语动词的译法

1.变通词义。有些动词，有时不能按字面意义直译。这时往往需要从全句内容出发(有时还需要联系上下文)，灵活地变通词义。

① Force and distance **measures** the amount of work. 力乘距离表示作功的大小。

② Rubber is not hard; it **gives way to** pressure. 橡胶不硬，遇到压力它就会变形。

③ The expense of such an instrument has **discouraged** its use.

这种仪器很贵，使其应用受到了限制。

④ When the ore is reduced to -60 mesh, it is more compatible to flotation.

这种矿石磨碎到 60 目以下时就比较适合于浮选。

#### 2. 改变结构

英语里有些动词，在译成汉语时找不到正好和它对应的动词，或者直译过来时不符合汉语的语法修辞习惯或易于引起歧义，因而在翻译时需要改变句子的语法结构。

➤将动词改译成**动宾**结构

The computer **schedules** the operations of the whole plant. 计算机能排定整套设备的操作时间表。

This clearance **minimizes** the possibility of “bridging”. 此空隙可将形成“桥凝”的可能性减少到最低限。

➤将动词改译成**递系**结构

① A fine thoria dispersion **strengthens** tungsten not only by the Orowan mechanism but also by stabilization of the substructure to higher temperature. 细粒氧化钍弥散体不仅由于奥罗万机理，而且由于亚结构能在较高温度下保持稳定而使钨得到强化。

② They **have trained** the workers in controlling the whole process from an electronic computer.

在用电子计算机控制整个操作过程方面，他们已使一些工人受到了训练。

➤将动词改译成**处置式**

英语里要求使用宾语补足语的役使动词(make, have, render, get, turn 等)，在译成汉语时，往往可以利用“把”字或“将”字作成处置式。利用处置式也可将被动语态改译为主动语态。

① We must **make** the phenomena clear. 我们必须把这些现象弄清楚。

② We have **had** the walls redone. 我们已经把墙壁重新粉刷了一次。

③ The potential energy of water is **turned to** kinetic energy in a hydroelectrical station.

在水电站，把水的位能转变为动能。

- ☉ They **took** the metals and acid radicals **as** primary products.

他们把金属和酸根看作初级产物。

➤将动词改译成**动宾结构**并将原宾语提前

- ☉ They **straighten and stress-relieve** the steel sheets on the stretching machine.

他们在拉伸矫正机上对薄钢板进行矫直和应力消除。

- ☉ It was the first plant to adopt tubular immersible coolers to **cool** the circulating condenser lead. 它是最先采用管状浸没式冷却器对循环的冷凝槽铅液进行冷却的工厂。

### 3. 转换词性

英语里的动词有时可译成汉语里的名词

- ☉ The scale is **marked** to show the strength of the current in amps. 度盘上的刻度是示出以安培为单位的电流强度。(动词 mark 改译成名词后用作主语)

- ☉ Circuit breakers are very large, but they **work** in exactly the same way as a small electric-light switch. 断路器很大,但其工作方式却和小的电灯开关(的工作方式)完全相同(动词 work 改译成名词**工作方式**后用作主语。)

### 4. 适当搭配

同一个动词,在它后面的宾语不同时,可能需要译成汉语里不同的词,以便和宾语搭配确当。如 reduce 按照汉语习惯,有减小、降低、减轻、减少、缩小、缩短等不同译法。

- ☉ reduce the pressure 减小压力
- ☉ reduce the temperature 降低温度
- ☉ reduce the weight 减轻重量
- ☉ reduce the time 缩短时间
- ☉ reduce supplies 减少供给
- ☉ reduce prices 减低定价
- ☉ reduce the scale of production 缩小生产规模
- ☉ reduce to powder 粉碎

## 第 2 节 非限定动词的译法

英语里非限定动词有三种:不定式、分词和动名词。它们不能单独用作谓语,不受主语的限定,没有人称与数的变化,但却能起着各种不同的语法功用。

### 1. 不定式的译法

感觉动词(feel, see, hear, imagine, observe 等)和一些役使动词(make, have, let, please 等)后面的不定式不用 to。

➤不定式用作主语

- ★To determine the optimum parameters will be time consuming. 确定最佳参数将是耗费时间的

★It is necessary to concentrate the minerals to be leached. 必须对(有)待浸出(的)矿物进行选别。

- ★To ensure that the reaction progresses reasonably fast **involves** the closest contact between the small amount of liquid phase and the much larger bulk of solid phase.

为了保证反应进行得相当快,要求在少量液相和多得多的固相之间有最密切的接触。

➤不定式用作宾语

want, decide, prefer, try, continue, begin, start 等动词后面可用不定式作**宾语**,这时一般可采用顺译法。

★Radio continues to find wider application in science. 无线电在科学上继续获得日益广泛的应用。

- ★When oxygen is blown into molten pig iron, silicon begins to oxidize first.

当往熔融生铁中吹入氧气时,硅首先开始氧化。



### ►不定式用作表语

★The basic action of an SCR is to switch power on very rapidly.

可控硅的基本作用是迅速接通电力。(SCR 是 silicon controlled rectifier 的缩写, 简译为可控硅。)

★Arc welding is to make metals together by means of an electric current.

电弧焊是利用电流将金属熔接在一起。

### ►不定式用作补足语

可要求不定式作宾语补足语的动词大体上分两类: 一类是所谓役使动词, 如 make, have, let, cause, enable, permit, allow 等; 另一类是表示主观意志的动词, 如 want, decide, determine, think, expect, compel, know。

★Power makes machines run. 动力使机器运转。

★The thermal decomposition of ammonium carbamate can be made to occur by the following methods. 氨基甲酸铵的热解可利用下列方法加以实现。

★Conductors allow electricity to pass through more or less freely. 导体可使电较为容易地流过。

### ►不定式用作定语

★In view of the drive **to save energy**, the weight reduction program of automobile is now actively pursued. 由于节约能源的压力, 现正积极进行减轻汽车重量的研究。

★Magnesium's tendency **to vaporise** can be reduced by alloying the metal with nickel or manganese. 镁的挥发倾向能通过把它同镍或锰作成合金而加以减小。

★The cutting tool must be harder than the material **to be cut**. 刀具必须比所要切削的材料硬。

★The highest pressure **to have been used** so far is about 100 atm.

迄今所使用过的最大压力为 100 大气压左右。

### ►不定式用作状语

(1) 用作目的状语: 一般可采用顺译法, 并添加“为了或臂以使”一类的词。

① To extend this work and to investigate alternative processes ...

为了扩大这项(研究)工作和研究其它工艺方案...

② Sodium silicate, or water glass, is used to render wood or clothes fireproof, and as a cement for glass and pottery.

硅酸钠(即水玻璃)可用来使木制品或衣服防火, 并可用作玻璃或陶器的粘结剂。

(2) 用作结果状语: 通常采用顺译法, 并添加-使(得)、(从)而、以至于等词语。

① This treatment involved heating at 1000°C **in the absence of** air to react vanadium pentoxide with carbon to form Vanadium trioxide. 这一处理包括在 1000 °C 下隔绝空气进行加热, 使得五氧化二钒同碳发生反应, 而生成三氧化二钒。

② Methane unites with oxygen to yield carbon dioxide and water.

甲烷与氧结合(从而)产生二氧化碳和水。

③ Such instruments are so well known as not to require detailed description here.

这些仪器是大家都很熟悉的, (以至于)不需要在这里详加介绍。

(3) 修饰形容词

① Up to now, copper alloys, according to CDA, have been more **expensive to pressure diecast** than aluminum and zinc, and a 25% reduction in the cost of pressure diecasting of copper alloys is expected with the new technique. 按照英国铜业发展协会的意见, 铜合金的压力模铸费用迄今一直是高于铝和锌的, 而在采用这项新技术后预料会降低 25%。

② They are **anxious to know** the result of this test flight. 他们急于要知道这次试飞的结果。

③ We are **glad to hear of** your success. 我们很高兴听到你们的成功。

(4) 与不及物动词连用: 在其后面, 用作补充说明情况的状语。

① It happens **to be installing** an 10000-ton hydraulic press in that plant.



碰巧那个工厂里正在安装一台万吨水压机。

- ② Surface tension tends **to make** the surface of a liquid contract.

表面张力会导致液体表面收缩。

### ➤不定式与介词短语“for…”连用

不定式前面有介词短语 for…时, for 的宾语(名词或代名词)是该不定式的逻辑主语。

- ② Heat from the sun makes it possible **for plants to grow**.  
来自太阳的热使植物得以生长。(it 代表 to grow.)
- ② In order **for the electron to remain** in its orbit, the two forces must be equal.  
为使电子保持在它的轨道上, 这两个力必须相等。
- ② It takes a year **for the earth to go around the sun**. 地球绕太阳转一圈需要一年时间。
- ② The workpiece is too complex **for me to finish machining** in such a short time.  
这工件太复杂, 我在短时间内加工不完。

### ➤不定式与疑问词连用

不定式前面可使用疑问连(代)词 how, when, where, why, what, which 等, 并和它一起构成名词性短语, 用作主语、宾语、表语和同位语。翻译时可采用顺译法, 并相应地表达出不同的疑问语气。

- ② **How to select** the cutting tool depends on the material to be machined.  
怎样选择刀具取决于所要加工的材料。
- ② It is now not difficult to forecast **when and where to rain**.  
现在, 预报什么时候和什么地方下雨并不困难。
- ② The problem is **how to reduce** costs. 问题在于如何降低成本。
- ② The workers have discussed the problem **how to serve** the peasants. 工人们已经讨论了怎样为农民服务的问题

## 第2节 分词的译法

- 现在分词: 具有主动、进行的意义
- 过去分词: 具有被动、完成的意义

现 在 分 词	过 去 分 词
a developing country	a developed country
发展中国家 (进行)	发达国家 (完成)
the driving wheel	the driven wheel
主动轮 (主动)	从动轮 (被动)
a changing compound	a changed compound
变化着的化合物 (进行)	起了变化的化合物 (完成)
the setting concrete	the set concrete
凝固着的混凝土 (进行)	〔已〕凝固了的混凝土 (完成)

### 一、现在分词的译法

#### ➤现在分词用作主语的定语, 并带有状语意义

- ② The largest power stations, **being the most efficient**, are run all the time at full load.  
一些最大的发电厂, 因为它们的效率最高, 总是满负荷运行。(表示原因)
- ② **Knowing how heat travels**, it is possible for us to control heat.  
知道了热怎样传导, 我们就能够对热进行控制。(表示原因)
- ② **Taking the reduction in area as a measure of ductility**, it can be seen that the ductility decreased rather gradually with increasing alloy content. (如果)用减面率作为延性的尺度, 就会看出延性是随着合金含量的增大而逐渐减小的。(表示条件)

- ④ **Arranging chemical** elements according to their atomic weights, we find similar ones at certain definite intervals. (如果)把化学元素按原子量排列起来, 我们便(会)在一定间隔处发现相似的元素。(表示条件)
- ④ The short circuits, **having been located**, can be put right.  
短路在查出以后就能修好。(表示时间)
- ④ **Assembling and adjusting**, one should have all parts clean.  
当装配和调试时, 应把所有零件清理洁。(表示时间)。
- ④ Acetoacetic acid very easily loses carbon dioxide on warming, **forming acetone**.  
乙酰乙酸加热时极易失去二氧化碳, 而生成丙酮。(表示结果)
- ④ When a laser beam strikes the metal, the energy changes the metal's structure and mechanical properties, **tending to harden and strengthen it**. 激光束照射金属时, 能量可以改变金属的结构和机械性能, 使金属硬化和强化。(表示结果)
- ④ It is probable that the sulfuric acid transfers hydrogen ions ( $H^+$ ) to the water, thus **producing an hydrated hydrogen ion and an acid sulfate ion ( $HSO_4^-$ )**.  
可能是硫酸把氢离子传递给水, 从而产生水化氢离子和  $HSO_4^-$  离子。(表示结果)
- ④ **Grasping the spring at the centre**, pull the middle section an inch or two towards one end and release it suddenly.  
握住弹簧的中心, 把弹簧中间部分往一端拉一两英寸, 然后突然松开。(表示方式)
- ④ Dilute water solutions of organic acids **color** blue litmus red, evolve hydrogen when acted on by metals, and are neutralized by metallic hydroxides **forming salts**.  
有机酸的稀水溶液会使蓝色石蕊(试纸)变红, 受金属的作用时会放出氢, 且会被金属的氢氧化物中和而生成盐类。(分词短语表示产生的结果。不可看成 hydroxides 的定语。)
- ④ Scrap is brought in from a scrap yard located at right angles to the shop axis **providing the correct scrap box orientation**. 废钢系从位于同车间中心线成直角的废钢堆置场运入, 从而保证废钢箱的正确定向。(表示结果而非目的。)
- ④ Fuel rates may vary depending upon the particular product (**formed coke**).  
燃料比是可变的, 视具体产品(型焦)而定。(表示方式)。

对于表示时间、条件的现在分词短语, 有时其前面可加上连词 **when, while, as, if, unless** 等, 这时其状语意义更为明显, 实质上相当于省略了主语和助动词 **be** 的状语从句。

- ④ Gases can do work **while expanding**. 气体在膨胀时能做功。
- ④ **If examining a drop of blood** under the microscope we shall see a huge number of red corpuscles. 如果用显微镜观察一滴血, 就会看到大量的红血球。

➤现在分词用作一般定语

- ④ Metals and alloys, like most solid matter are aggregates of crystals; they are built up of units, **consisting of** small groups of atoms ...  
象大多数固体物质一样, 金属和合金都是晶体聚集体; 它们由许多(晶格)单元构成, 每个单元则是由一些原子群组成的。(分词短语相当于非限制性定语从句)
- ④ A universal reaction scheme has been developed, **revealing** of the following single steps. 已研究出主要由下列各单一工序组成的通用反应流程。(单纯的定语)

➤现在分词用作宾语补语

- ④ It is the carbon monoxide **burning**. 这是一氧化碳在燃烧。(作为宾语补语)
- ④ I hope that we can look forward to seeing this subject **being developed**.  
我希望我们可以预期这一课题将得到发展。(一般式被动态现在分词)(作为宾语补语)
- ④ A watt of power will keep a current of one ampere **flowing** in a circuit under a pressure of one volt. 一瓦的功率将使一安培电流在电压为一伏的回路中流动。(作为宾语补语)  
宾语补语和用作定语的现在分词形式一样但意义不同, 译法也不相同。辨别的方法

主要根据该宾语前面的动词 (包括不定式及动名词) 的类型。要求现在分词作其宾语补足语的动词只有感觉动词及大部分使动词, 即 *feel, see, hear, notice, know, observe, imagine, watch, find, have, get, keep, set, want, leave, stop, start* 等。在这类句子中, 现在分词的逻辑主语就是它前面的动词宾语, 大都可以用顺译成“感觉到某某在作某事”或递系结构“使某某作某事”。

- ④ The chemical compound was found **changing** slowly when heat was applied. 加热后曾发现这种化合物发生缓慢的变化。
- ④ The vapour stream from the third separator is cooled to about 40°C by indirect heat exchange with cooling water. The solution **formed** is then pumped into the second absorber where it is cooled to a similar temperature, **absorbing** the gases emerging from the second separator. 来自第三分离器的蒸汽流, 通过间接热交换, 用冷却水冷却到 40°C 左右。然后将所形成的溶液泵送到第二吸收器中, 在这里该溶液吸收了来自第二分离器的气体, 并被冷却到相同的温度。

## 二、过去分词的译法

### ➤过去分词用作主语的定语, 并带有状语意义

- ④ Electric motors are machines which change electric power into mechanical driving power. **Compared** with other kinds of motors they are quiet, smooth running, small, clean, and easily controlled. 电动机是把电功率改变成机械传动功率的机器。和其他发动机相比, 电动机噪音较小、运转平稳、体积小、洁净, 并且易于控制。(表示比较)
- ④ In each of these control centers an engineer sits **surrounded** by dozens of meters which show how much electric power is passing through each lines in his area. 在每一个这样的控制中心, 有一个工程师坐在周围有几十个仪表的控制室里, 这些仪表能示出在他的辖区里的每条线路上有多少电力在通过。(表示方式)。
- ④ The assembling of the machine **completed**, we started operating it. 机器装配好之后, 我们就开始(使它)操作了。(表示时间)
- ④ **Viewed** through a microscope table salt appears as a mass of tiny cubes. 食盐在显微镜下看起来好象是无数小正方体。(表示条件)

### ➤过去分词用作一般定语

- ④ One kind of ammeter, **called** a moving-iron ammeter used to measure the strength of electric currents is shown in Fig.25. 一种叫做动铁式安培计的仪表, 常用来测量电流强度的, 示于图 25 中。
- ④ When a piece of metal is rubbed with wool, the electricity **produced** moves freely through the metal.

用呢绒摩擦一块金属时, 所产生的电可从该金属中自由地流动过去。

- ④ Further aluminium foil producers have conducted annealing tests **aimed at** obtaining soft and dry foil in thickness of less than 0.1mm by transferring the foil directly over gas flames. 此外, 一些铝箔厂已经进行了使铝箔直接从煤气火焰上面通过的退火试验, 以期获得厚度在 0.1mm 以下的柔软而干燥的铝箔。

### ➤过去分词用作表语

- ④ The car has been **painted**. 这辆汽车已经喷漆了。
- ④ Compounds are **composed** of elements. 化合物是由元素组成的。
- ④ Soft iron becomes **demagnetized** easily. 软铁易于去磁。
- ④ This appliance is not well-**suited** for home use. 这种器具不大适合民用。

### ➤过去分词用作宾语(主语)补足语

- ④ In all such reactions we have the hydrogen in the acid **replaced** by the metal to form a

salt. 在所有这些反应中, 我们都是让酸中的氢被金属取代, 从而生成了盐。

- ② We can get the work **finished** in time. 我们能按时完成这项工作。
- ② Have you seen steel ingots rolled into brooms? 你曾看到把钢锭轧制成初轧坯吗?
- ② He felt the aeroplane lifted up. 他感到飞机上升了。

能要求过去分词作为其宾语补足语的动词也是限于一部分**感觉动词**和**役使动词**, 即 feel, See, hear, find, make, keep, have, get, permit, want 等 9 这类。句子翻译成汉语时, 大都要利用处置式或被动语态, 也可译成递系结构或以主谓结构为宾语的动宾结构。

### 三、分词独立结构的译法

►分词独立结构由另一主语和分词组成、独立于句子以外的成分, 实际上相当于一个状语从句或并列分句, 分词则相当于谓语动词。

►在分词独立结构中, 现在分词或过去分词的前面都有一个名词性词语(包括代词、动名词), 作为其逻辑主语。

►分词独立结构有时具有状语意义, 有时用作补充说明。因此, 在译成汉语时, 一般可采用顺译法, 译为状语从句或并列分句。

- ② The material being too hard, the drill does not work efficiently.  
由于材料太硬, 钻头不能有效地对它加工。(表示原因)
- ② Other conditions being equal, the pressure remains constant.  
其它条件相等时, 压力不变。(表示条件)
- ② In the Bessemer process the molten metal is oxidized with air, the silicon, carbon and manganese being oxidized before the iron.  
在转炉炼钢法中是用空气来氧化铁水, 硅、碳和锰比铁先氧化。(表示方式)

### 三、动名词的译法

#### 1. 译为动宾结构(包括处置式)

- ② Disease bacteria may be killed by boiling or by **adding small amounts of certain chemicals**. 病菌可通过煮沸或少量加入某些化学药品加以杀死。
- ② The catalyst is charged into each reactor tube in multiple zones of **increasing catalyst concentration from inlet to outlet**.  
催化剂以从入口到出口逐步增大其浓度的多层方式装入每个反应管中。
- ② **After having been tempered**, the steel becomes stronger because its grains get finer.  
经过回火之后, 钢的强度增大, 因为其晶粒变细了。

#### 2. 译成主从短语

- ② The absorbance decreases with **increasing water concentration**.  
吸光度随着水浓度的增高而降低
- ② There is no serious problems of **controlling the temperature**.  
不存在严重的温度控制问题。
- ② Oils used in **the machining of metals** are of two main classes—straight oils and soluble oils.  
金属的机械加工所使用的油可分为两大类: 普通油和溶混油。
- ② **Melting a substance under increased pressure** is rather easy.  
在较高压力下, 物质的熔化是颇为容易的。

句子中的动名词短语可以根据具体情况译成动宾结构或主从短语, 用作标题的动名词短语, 则应尽可能译为主从短语。

- ② **Coloring anodically oxidized aluminium**. 阳极氧化铝的着色。
- ② **Preventing water-hammer in blast furnace cooling system**. 高炉冷却系统中水锤现象的防止。

④ **Manufacturing** die castings of zinc alloys. 锌合金压铸件的生产

④ **Driving** light machine tools or domestic appliances. 轻型机械工具或家用器械的传动。

翻译动名词短语时, 为了避免歧义, 不让读者把动名词误会为形容词, 或为了汉语读起来顺口, 也往往需要译成**主从短语**, 而不译作**动宾结构**。

④ desulphidizing steel 钢的脱硫(不译为“脱硫钢”)

④ mixing the cement with water 水泥和水的混合(不译“混合水泥和水”)

### 3. 译作句子形式

► 动名词短语比较长, 或前面有物主代词或名词所有格来表示其逻辑主语时, 可译为句子形式(各种从句或并列分句)。

④ **Fouling of air cooling passages by extruding tar** can result in overheating and mechanical failure of the sliding plate. 空气冷却通道被挤压出的焦油所污染, 会引起(滑动水口)滑板的过热和机械破裂。(译为主语从句)

④ **Owing to its always being combined with oxygen**, iron is rarely found free in nature. 由于铁总是和氧结合在一起, 在自然界很少发现游离铁。(译为状语从句)

④ The signal was shown about the computer's being in order. 信号表明计算机没有毛病。(译为宾语从句)

► **动名词**的语法功用都是相当于**名词**(用作主语、宾语和表语), 但是动名词(包括那些已经完全转化成名词的动名词)也可起**形容词**的作用, 即用作**名词的前置定语**(相当于名词的转换形成形容词)。

► 作前置定语用的**现在分词**表示所修饰名词的**行为状态**, 其所修饰的名词是现在分词所表示的行为的主体, 也可以说名词是分词的逻辑主语。

④ moving parts (=parts which are moving) 运动件(可以运动的零件)(现在分词)

④ inducing current (=the current which is inducing)  
施感电流(能产生感应作用的电流)(现在分词)

④ boiling water (=water which is boiling) 沸水(沸腾着的水)

④ caving bank (=the bank which is caving) 崩坍河岸(正在崩坍中的河岸)(现在分词)

► 用作前置定语的**动名词**表示所修饰名词的**用途**, 或则起一种**限定作用**; 同时该名词也不是动名词的逻辑主语。

the air cooling passage (=the passage for air cooling) 空气冷却通道

a caulking hammer (=the hammer for caulking) 堵缝锤

boiling temperature (=the temperature of boiling) 沸点

a sleeping car (=the car for sleeping) 卧车

Overall fuel consumption in metalizing pellets is about 13 million Btu per ton. 在球团矿金属化过程中的燃料总耗量约为 1300 万英热单位/吨。(动名词短语用作介词宾语, 译为主从短语)

## 第三节 短语动词的译法

► 行为动词可和其它词类一起构成短语动词(也叫词组动词), 这时整个短语起一个**行为动词**的作用。对于常用的短语动词要加以记忆; 翻译时对于不了解其意义的短语动词必须查阅字典, 不可望文生义地贸然译出。

★ take place 发生(动词+名词); give way to 屈服(动词+名词+介词)

★ switch on 接通(动词+副词); keep up with 赶上(动词+副词+介词)

★ depend upon 取决于(动词+介词)

④ Underground electric power cables are enclosed by a lead sheath to **keep out** water.  
地下电力电缆封装在铅皮内, 以防止水浸入。

④ In small lamps, all the air is pumped from the glass bulb, forming a vacuum, which **prevents** the white-hot filament **from** burning away.



在小灯泡里，把玻璃泡内的空气全部抽出，形成真空，这就能防止白热的灯丝烧坏。

- ④ Faulty electric wiring may **result in** electric shocks or fires caused by short circuit.  
错误的布线会引起由短路造成的触电或火灾。
- ⑤ The large generators are made very much stronger, because they have to **stand up to** very powerful magnetic forces.  
大型发电机制造得坚固得多，因为它们必须经受住十分强大的磁力。

## 第四节 时态的译法

英语动词的时态共有十六种，即按**时间**分为现在时、过去时、将来时和过去将来时四种。每种时间又可按**进行方式**分为一般式、进行式、完成式和完成进行式四类。这十六个时态式是指**主动语态**而言的。另外还有十个**被动语态的时态式**。所以连语态考虑在内，一共有 26 个时态式。

### 一、一般现在时

►一般现在时通常用来表示：①客观存在的事实与普通真理；②现在存在的情况与状态；③经常性的动作；④主语的特征；⑤条件及时间状语从句中将来的动作(即用以代替一般将来时)。其译法比较简单，除了在表示主语的特征时需要在动词前面加“能”、“可”或“会”字外，其余都可直接译出。

- ④ Earth **moves** around the sun. 地球围绕太阳旋转
- ④ Electricity **plays** a very important **role in** our daily life.  
电在我们日常生活中起着十分重要的作用
- ④ The huge blast furnace **burns** up about 5000 tons fuel (coke and heavy oil) a day.  
巨型高炉每天烧 5000 吨燃料 (焦炭和重油)
- ④ Rubber **prevents** electricity **from** passing through it. 橡胶能阻止电流通过
- ④ The lamp will be **lit up** instantly the switch is turned on. 一拨开关，电灯就亮了

### 二、一般过去时

►一般过去时表示：过去的动作与状态；过去经常或反复发生的动作。  
►有时为了更准确地翻译，或为了强调起见，可在动词前后添加：已、曾、过、了等字；或在句首添加：以前、当时、过去等时间副词。

- ④ The airplane **landed** at the airport here at 10 o'clock last night.  
昨晚十时飞机在这里的机场着陆。
- ④ Helium was **found** in the sun nearly 30 years before it was **isolated** and **identified** on earth.  
从太阳上发现氦比在地球上离析并鉴定出氦几乎早 30 年。
- ④ The construction of the Taching oilfield **started** in 1960. 大庆油田的建设是 1960 年开始的。
- ④ Twenty years ago the rolling mill **was** the centre of attention since the main interest was in meeting the steadily rising demand.  
二十年前轧机曾经是注意的中心，因为当时主要的兴趣在于满足稳定增长的需要。
- ④ The rocket **landed** on the moon. 火箭在月球上着陆了。
- ④ He **used** to oil the lathe once a day when he was a turner.  
以前他当车工时，每天总要给车床加一次油。

### 三、一般将来时

►一般将来时表示：将要发生的动作与状态；将来经常发生的动作；事物的某种固有特征。翻译这种时态时，大都可在动词前面添加**将、要、会**等字。



- 📖 We **shall meet** him at your factory. 我们将在你们的工厂里遇见他。
- 📖 These students **will work** in the farm once a week. 这些学生每周要到农场劳动一次。
- 📖 If the resistance of the circuit is high, the current **ill decrease** rapidly, but a high induced e.m.f. will result. 如果电路的电阻高, 电流就会迅速减小, 但能产生强的感应电动势。
- 📖 We are **going to launch** another artificial satellite of earth next week.  
下周我们将发射另一颗人造地球卫星。
- 📖 This chapter **is to discuss** the welding of steel. 本章要讨论钢的焊接。

#### 四、一般过去将来时

➤这种时态常用在主句动词为过去时态的名词性从句(主要是宾语从句)中, 翻译时常在动词前面添加“将或要”等字。

- 🕒 Last month, he said that he **would start** for Shanghai this month.  
他上月曾说过, 他将在本月去上海。
- 🕒 We were sure that special radio instruments **would provide** automatic take-off and landing of airplane in the future.  
我们那时确信专门的无线电仪表以后会为飞机的自动起飞和着陆提供条件。
- 🕒 They said that **they would** check up and repair these machines.  
他们说过(他们)要检查和修理这辈机器。
- 🕒 I knew that I **should take part in** an important meeting next week.  
当时我知道我将在后一周参加一个重要的会议。

#### 五、进行式

➤进行式表示某一时间正在进行的动作。译成汉语时, 通常要添加正、在、正在等字样, 有时也可在动词后面加上助词着字。

➤leave, start, go, come 等少数几个动词的现在进行式可用来表示即将发生的行为。

- 🕒 They are making an interesting experiment this week. 本周他们正在进行一项有趣的实验。
- 🕒 We shall watch you when you are making this experiment. 当你做这项实验时, 我们将看着你。
- 🕒 The train is leaving for Beijing tomorrow. 这列火车明天将要开往北京。
- 🕒 Even before the Second Five year Plan, China was already producing all kinds of lathes, machines, apparatus and instruments. 甚至在第二个五年计划之前, 中国就已经在生产(着)各种车床、机器、器械和仪表。(过去进行式)
- 🕒 I shall be working at the moment of your arrival. 你到达时我将正在工作。(将来进行式)

➤在翻译完成进行式时, 常须在动词前添加一直在字样, 借以强调事情的延续性。

- 🕒 Since 1964, Alcan has been using digital computers to help control and optimize the output of its various processes. 自1964年以来, 加拿大铝业公司一直在利用数字计算机来帮助控制公司的各种生产过程和使各该过程的生产最佳化。(现在完成进行式)

➤go 的现在进行式 **be going to+原形动词**表示最近将来大概要发生或计划去做的事情, 可译为就要、将要。

➤Get、grow 等动词的现在进行式表示逐渐变化的局势。

The operation of this machine is getting better. 这台机器的操作情况变得越来越好了。

➤所有动词的现在进行式, 与 **always、for ever、all the time、constantly** 等状语合用时, 表示总是、老是的意思。

She is always operating a lathe. 她总是开车床。

➤勿滥用着字。短时完成的动作(进入, 打破等), 不能用着字。Think, find, hear, look, see 等动

词有时可用**着**字,有时不能用**着**字。注意 Mean, mark 等动词的一般现在时倒可译为**意味着…**、**标志着…**。

## 六、完成式

➤完成式一般说来是表示在某一时间以前已经完成的动作。在科技书刊中比较常见的是现在完成式,它表示:①到现在为止已经或刚刚完成某种与现在有关的动作;②过去已经开始而持续到现在的动作(常与 **since**、**for**、**in the past…**等时间状语连用);③时间或条件状语从句中的将来完成式。

➤翻译完成式时可在动词前面添加时间副词**已(经)**、**曾(经)**和在后面添加助词**了**、**过**或**过…了**。

★The principles of aluminum foil and strip **manufacture have been** the subject of a series of investigations recently. 铝箔和铝带的制造原理近来已成为一系列研究的主题。(现在完成式)

★The carbon **has lost** electrons and the oxygen **has gained** electrons in the change. 在变化过程中,碳失去了电子,而氧获得了电子。

★By the time the pressure **has fallen to** atmospheric pressure, the temperature will drop also to the steam temperature at that pressure. 当压力降到大气压力时,温度也将降到常压下蒸汽的温度。

★By the end of 1977, they **had already overfulfilled** the major targets set originally for 1980. 到1977年底,他们已超额完成了原来为1980年规定的主要指标。

★It was reported that scientists **had worked at** the problem of storing the sun's heat for many years. 据报道,对于贮存太阳能的问题,科学工作者曾经进行过多年的研究

★By the end of this month, we **shall have carried out** our production plan. 到本月底,我们将完成生产计划。

★It was said that by the end of this year they **would have turned out** 50 special purpose digital computers. 据说,到本年底他们将生产出五十台专用的数字计算机。

➤应当注意**时态呼应**的问题,即当主句谓语为**过去时态**时,其名词性从句(主要是宾语从句)的时态要受它的影响,而作出相应的变化。

➤如果主句是**过去时**,从句的时态式应作如下的变化:

一般现在时 ⇨ 一般过去时

现在进行式 ⇨ 过去进行式

现在完成式 ⇨ 过去完成式

一般将来时 ⇨ 一般过去将来时

一般过去时 ⇨ 专过去完成时

☉ He **said** that Comrade Lee **worked** very hard. (当时)他说过李同志的工作是十分努力的。(不应误译为:他曾说过李同志曾经工作得很努力)

☉ He **knew** that many workers **were learning** English. (当时)他知道许多工人在学习英语。

☉ I **saw** that he **had made** a mistake. (当时)我看出他犯了一个错误。

☉ I **thought** (that) he **would be** a turner. 当时我以为他将成为一个车工

☉ I **thought** (that) he **had been** (was) a turner two years before. 我曾以为他已当了两年车工了。

➤非限定动词的时态变化比较简单

★不定式主动语态有一般式、进行式、完成进行式,被动语态只有一般式和完成式;

★现在分词的主动语态和被动语态各有一般式和完成式两种形式;

★过去分词只有被动语态一般式一种形式;

★动名词的时态形式和现在分词相同。

## 第5节语态的翻译

►语态是动词表示主语与谓语关系的一种形式, 分为主动语态与被动语态两种。主动语态表示主语是谓语中包含的动作者的执行者, 被动语态表示主语是动作的对象。

►英语里被动语态是通过助动词 **be** 和及物动词的过去分词组成复合谓语来表现的。被动语态共有 10 种时态式, 而科技书刊中常用的只有 5 个时态式(即一般现在时, 一般过去时, 一般将来时, 现在进行式和现在完成式)的被动语态。

►情态动词也能构成被动语态。

## 一、译成主动句

### 1. 不改动主语及句子结构, 直接变换成主动语态。

- ① Solution to the problem **was** ultimately **found**. 这个问题的解决办终于找到了。
- ② Several approaches to the problem of ladle skull slag or deoxidation-scum removal are **being tried**. 罐内结壳、熔渣或脱氧浮渣清除问题的几项解决方案正在试验中。
- ③ The reaction **may be carried out** in fluidized bed reactor with a provision for adequate temperature control. 反应可在具有适当温度控制设备的流床反应器中进行。
- ④ The experiment **will be finished** in a week. 这项实验将在一周后完成。

### 2. 不改动主语但改变谓语的结构。

- ① Growing needs for cryolite by the aluminum and other industries are increasingly **being met** via synthetic feed-material. 炼铝工业和其它工业对冰晶石的日益增长的需要, 正通过采用合成原料而不断地得到满足。
- ② The discovery **is** highly **appreciated** in the circle of science. 这一发现在科学界中得到很高的评价。
- ③ Sometimes the communication **would be** seriously **disturbed** by solar spots. 通讯有时会受到日斑的严重干扰。
- ④ The production **has been** greatly **increased**. 产量已经有了很大的提高。
- ⑤ A motor which is too small **would be subjected** to frequent overload. 过小的电动机时常会发生超载。

### 3. 原主语改译为宾语, 另添加适当的主语。

- ① Three-phase current **should be used for** large motors. 大型电动机应当使用三相电流。(将动词的逻辑主语译作主语)
- ② Air **can be** liquefied by us. 我们能将空气液化。(将原句中指明的主动者译作主语)
- ③ It is well **known** that metals are essential materials in industry. 大家知道, 金属是工业中不可缺少的材料。
- ④ It **is said** that numerical control is the operation of machine tools by numbers. 人们说, 数控就是机床用数字加以操纵。

### 4. 译成无人称句, 将原主语改译成宾语, 或将原主谓短语改译成谓语动词。当原来谓语中包括有 **must**、**should**、**would** 等情态动词而改译为无人称句时, 译文便成为祈使语气。

- ① The temperature **was raised** to 850K. 把温度提高到 850K。
- ② If water **is heated**, the molecules move more quickly. (如果)把水加热, 水分子就运动得更快。
- ③ Thus, no catalyst **was found** to be stable under the conditions employed in this work. 因此, 不曾找到在本研究工作所采用条件下是稳定的催化剂。
- ④ Because of this, applications such as high temperature wires, heat sinks, and continuous casting mold are **foreseen**. 因此, 预见到象高温丝、吸热设备和连铸用结晶器一类的用途。
- ⑤ The fuel **must be** tested to determine its suitability before application. 使用前须对燃料进行试验, 以确定其适用性。
- ⑥ Attempts **were made** to regenerate the catalyst by passing oxygen at the rate of 8cc/sec for

4 hours at 300K. 曾试图再生催化剂,其方法是在 300K 下以 8 厘米<sup>3</sup>/秒的流速(对催化剂)通氧 4 小时氧。

- ☉ The unpleasant noise **must be** immediately put an end to. 必须立即终止这种讨厌的噪声。

5. It 导引的习惯句型中的被动语态,可译为无人称句或不定人称句。

- ☉ It was reported that... 据报道, ...; 有人报告, ...
- ☉ It must be admitted that... 必须承认, ...
- ☉ It will be seen from this that... 由此可见, ...
- ☉ It is stated that... 据说, ...; 有人说, ...

## 二、译成被动句

汉语里表示被动语态的方式有被、受、由、加以等字和一些特定句型。

1. 使用被字或受字

- ☉ Up to now, sulphur dioxide **has been regarded as** one of the most serious of these pollutants. 到目前为止, 二氧化硫一直被看作是这些污染物中最严重的一种。
- ☉ The  $\gamma$ -rays are not **affected** by an electric field.  $\gamma$  射线不受电场影响。
- ☉ Its use is therefore **restricted** to articles in which lightness is a prime essential. 因此它的用途被限于制造首先要求重量小的物件。

2. 使用由、给表达被动意义。此外让、叫、遭、挨、使等字也可。

- ☉ Transformer cores are built from laminated silicon steel. 变压器铁心由硅钢片构成。
- ☉ Many works are being done by machines. 许多工作现在是由机器完成的。
- ☉ Pure oxygen must be given patients in certain circumstances. 在某些情况下必须给病人吸纯氧气。
- ☉ They should be severely criticized for their production plan was not completed in time. 他们没有按时完成生产计划, 应当给他们以严厉批评。

3. 使用加以、予以字样。

- ☉ A catalyst consisting of a mixture of 1 per cent palladium and 99 per cent vanadium pentoxide **was prepared** by the method as given in a patent. 由 1% 钯和 99% 五氧化二钒的混合物构成的催化剂, 是用一份专利中给出的方法加以制备的。
- ☉ Other processes will **be discussed** briefly. 其它方法将简单地加以讨论。
- ☉ The finished products must **be carefully inspected** before delivery. 成品在出厂前必须仔细地予以检查。
- ☉ The design will **be examined** by a special committee first. 这项设计将先由一个特别委员会予以审查。

4. 采用为...所...、是...的句型。

- ☉ This extraction rate was **confirmed** in batch tank tests. 这一提取速度已为分批槽内试验所证实。
- ☉ The hypothesis has been **proved** to the hilt by the results of experiments. 这一假说已为实验结果所充分证明。
- ☉ Iron is **extracted** from the ore by smelting in the blast furnace. 铁是通过高炉冶炼从矿石中提取的。
- ☉ The majority of materials were **made** as 2Kg swaging bars. 大多数材料是制成 2Kg 重旋锻条坯(的)。

## 三、谓语分译

这种方法则是将被动态谓语从原句中分出来,译成带主语(泛指人称的)或不带主语的独立成分。

- ☉ The process **was stated** to have reduced the nitrogen oxide content to only 10~3000 ppmv.

据称，此法只能将 NO 含量降到 0.001~0.3vol%。

- ② In the present study the rate constant based on mass transport of hydrogen in the metal phase **was found** to be inversely proportional to... 本研究**发现**，基于氢在金属相中的物质传递的速度常数，是和...成反比。
- ② Hydrogen **is known** to be the lightest element. 人们**知道**氢是最轻的元素。
- ② It is just the energy which the atom thus yields up that **is held** to account for the radiation. 人们**认为**，这种辐射正是由原子释放出来的能量造成的。

#### 四、非限定动词的被动语态

►不定式一般式所表示的行为，通常与谓语动词所表示的行为同时发生或在它之后发生。**被动不定式**用作定语时多表示将来时态。使用**被动不定式的完成式**时，表示该行为发生在谓语动词所表示的行为之前。

- ② This oxygen has **to be removed** in the process. 这种氧必须在此过程中除去。
- ② The current **to be measured** enters the coil through the wire. **将要**(加以)测量的(待测量的)电流通过电线进入线圈。
- ② It is impossible for heat **to be converted** into a certain energy without something lost. 把热转变成某一种能而不损失一些是不可能的。
- ② The plant was found **to have been** thoroughly damaged by the enemy. 当时发现工厂已被敌人彻底破坏。

►现在分词的一般式**被动语态**所表示的行为是说话时正在进行的动作，或与谓语动词所表示的动作同时进行；现在分词的**完成式被动语态**所表示的行为则是在谓语动词所表示的行为之前发生。

- ② The house **being built** will be our new shop. 正在建筑中的这所房子将是我们的新车间。
- ② **Being cooled** in the air, the metal hardened. 金属在空气中(被)冷却时就硬化了。
- ② **Having been** well-insulated, the wire may be used as a conductor. 将金属线很好地绝缘之后，就可用来作导(电)线
- ② The force required to turn a shaft depends on the length of the lever arm used. 转动一根轴所需要的力取决于所用杠杆臂的长度。

►动名词的一般式**被动语态**所表示的行为是与谓语动词所表示的行为同时发生，或在其后发生，而其**完成式被动语态**所表示的行为则是在谓语动词所表示的行为之前发生。

- ② On **being sent** out ahead of the plane radio waves travel with the speed of light. 无线电波在飞机前面**发送出去**之后就**以光的速度前进**。(一般式被动语态表示同时发生的行为。)
- ② The constructor insisted upon his device **being tested** under operating conditions. 设计师坚持他的装置要在工作的条件下**试验**。(一般式被动语态表示将来发生的行为。)
- ② The machine ran on again after its **having been** repaired. 这台机器在**修理好**以后又继续运转了。(完成式被动语态表示以前发生的行为。)

#### 第 6 节 语气的再现

►英语里句子的语气用来表示**说话人对某一行为和事物的看法或态度**。它是靠改变句子的结构和语序，使用某些特定词语和改变动词时态等方法来表现的。而汉语则主要是利用语气词：**啊、啦、了、吧、的、吗、呢、罢了**等来表示不同的语气。在科技英语翻译中，必须正确地再现原文的语气，才能更好地保证译文的质量。

►英语里有四种语气，即陈述语气、疑问语气、祈使语气和虚拟语气。陈述语气里包括肯定句和否定句，疑问语气里包括一般疑问句和特殊疑问句，祈使语气里包括命令句和祈求句，虚拟语气里包括真实条件句和非真实条件句。



## 一、祈使语气

➤祈使语气用来表示**请求、要求、命令、劝告**等；在科技书刊中更常用来表示**建议和指示**。特别在工艺操作规程和设备说明书中大量使用祈使句。还可用来表示**条件或设想**。

➤祈使语气在句子结构上的特点是不用主语。如主语原应用 **you**，则直接加以省略；如主语原应为第三或第一人称，则利用 **let+第一或三人称代词+动词原形**的结构。

- ① Be more careful! 细心一些!
- ② Don't smoke here! 此地禁止吸烟!
- ③ Let us begin ... 让我们开始...
- ④ Let him do it. 让他去干吧。

➤一般祈使语气的译法

对一般的命令句或祈求句，可直接译成汉语的祈使句(无主语句)，有时可利用**吧**字。

- ① Write down the pressure data. 把压力数据记下来
- ② Don't forget opening the switch! 不要忘记拉开电闸!
- ③ Let us now look at the influence of the sponge iron rate on the furnace output.  
现在让我们看一看海绵铁比率对炉子产量的影响吧。
- ④ Let there be no mistake about the data. 不要让数据出错。

➤特殊祈使语气的译法。在科技书刊中常利用一定句型或某些动词 (**assume, suppose, let, say, imagine, take**)来表示设想或条件。

- ① **Place** a clean iron part in the solution of copper sulphate, and the part will be coated with red copper. 把一个干净的铁制件放在硫酸铜溶液中，它就会涂上一层紫铜。
- ② Supersonic aeroplanes which fly continuously for, **say**, half an hour at such high speeds will have to make arrangements for keeping the aeroplane cool. 超音速飞机以这样高速继续不停地飞行(假定达半小时之久)，因此须设法使飞机保持冷却。
- ③ **Open** the key, and you may obtain an induced current in the opposite direction. 将电键断开，你就会得到反向的感应电流。
- ④ **Suppose** (that) a block rests upon an inclined plane. 假定一块木头停放在一个斜面上。
- ⑤ **Let** R denote the resultant of all forces. 设 R 表示所有力的合力。
- ⑥ **Assume** that the load current remains constant but that the input voltage from the power supply starts to rise. 假定负载电流不变，但从电源输入的电压开始上升。
- ⑦ **Imagine** an express train, running along at 150Km per hour. 设想一列以 120Km/h 速度行驶的特别快车。
- ⑧ (Let us) **take**, for example, a steel plant. (让我们)以钢铁厂为例。

## 二、虚拟语气

➤英语里虚拟语气是用来表示**愿望、假设、建议、目的、间接命令、推测、怀疑**等概念。它主要依靠**改变动词形式和时态**来表示。

➤虚拟语气分为**未定虚拟语气**和**纯粹虚拟语气**两种。**未定虚拟语气**用于真实条件句，表示还未确定的但有可能实现的行为或状态。**纯粹虚拟语气**用于非真实条件句(亦称虚拟条件句)，表示所假设的情况与事实相反、根本不存在或极少可能实现。

➤由于科技论著中常常提出一些设想和推断，所以条件句是使用得很多的。

### 1. 真实条件句的译法

- ① It is proper that everybody **should do** his duty. 正确的是人人各尽其责。(表示建议或劝告)
- ② **Might I visit** your plant? 我可以参观你们工厂吗? (表示请求)
- ③ That looks as if it **were going to rain**. 那看来好象和下雨一样。(表示方式或比较)
- ④ They work hard that they **might fulfill** their production plan in time.



他们努力工作，为的是他们可以按时完成生产计划。(表示目的)

④ I can not tell whether it **would be true**. 我不能肯定是否真有其事。(表示怀疑)

④ Whatever he **should say**, I will not change my opinion.  
不管他说些什么，我不会改变我的意见。(表示让步)

④ In radioactive changes one **would have to** assume that a charged helium atom (2 protons and 2 neutrons) **went off** whenever an alpha particle **was emitted**.

在放射性蜕变中，人们必须假定：每当一个  $\alpha$  质点射出时，一个带电荷的氦原子(两个质子和两个中子)也就放出。(表示假定)

④ Under certain conditions an intermediate product, an aldehyde, may be isolated, but if the process **is so arranged** that this compound remains in contact with the oxidizing agent it is further oxidized to the acid. 在某些情况下，会离析出中间产物-醛，但如果在过程进行时使醛继续同氧化剂接触，它就要进一步氧化成酸。(表示真实条件)

→A、表示与现在事实相反的假设条件时，虚拟条件从句中谓语动词用一般过去时(如果动词是 be, 则一律用 were); 主句中动词则用过去将来时(即 would、should、could 或 might+原形动词)(也叫虚拟将来时)。

④ If there **were** no frictional losses in a machine, the machine **would be** 100 per cent efficient.  
如果机械里没有摩擦损失，其效率就是 100% 的了。

④ What **would happen** if one **broke** one of the wires of the electric circuit?  
假如有人把电路中的电线弄断一条，会发生什么事呢？

④ If the reaction **took** hours, and not seconds, the fuel costs **would be** prohibitive.  
如果这一反应需要数小时 而不是几秒钟，那末燃料费就太高了。

④ If the North Star **were** obliterated the earth **would** continue to receive light from it for almost 44 years. 倘若北极星被湮没，在几乎 44 年的长时期内地球还会继续接受它的光。

④ If it **were** not for friction, you **could not** walk. 如果不是由于摩擦，你就不能走路。

④ If you **were** to try, you **might be** able to do it. 假如你设法去做，你也许做得来的。

→B、表示与过去事实相反的假设条件时，虚拟条件从句中谓语用过去完成式；主句中动词用过去将来完成式。

④ Much labor **would have been saved** if electronic computers **had been invented** before.  
假如以前发明了计算机的话，那就会节省了很多劳力。

④ If more water **had been used**, the temperature change **would have been** smaller.  
倘若使用了较多的水，温度变化本来会小一些的。

④ If cast iron **had not been** brittle, it **would have been** possible to forge it.  
如果铸铁不是脆性的，它就能锻造了。

④ If you **had tried**, you **would have been** able to do it.  
假如你曾经设法去做，你本来是能够做到的。

④ Those several compounds **could not have been** formed if the chemical reaction **had been** stopped. 倘若这一化学反应曾经停止过，就不能形成这几种化合物了。

④ If there **had been** no electronic computers, there **would have been** no artificial satellites or rockets. 假如没有电子计算机，就不会有人造卫星和火箭了。

④ It **would have taken** them a long time to solve the complicated problem if computers **had not been** employed. 要不是采用了计算机，解这个复杂问题就会占用他们很长的时间。

→C、表示与将来事实相反或实现可能性很小的假设条件时，以及婉转地陈述主观意见或提出推理时：虚拟条件从句中谓语动词用虚拟将来时 (即 should, could, might + 原形动词) 或虚拟过去时 (即 were to + 原形动词) 或省去 should 的原形动词(不分人称); 主句中谓语则一律用虚拟将来时 (即 should, would, could, might + 原形动词)。

- ④ If something **should go wrong**, the signal lamp **would light up**. 万一发生什么事故, 信号灯就会照亮。
- ④ If the polarities of cathode and anode **should be** reversed, there **would be** no electron flow. 假使倒换一下阴极和阳极的极性, 就不会有电子流动。
- ④ If we **were to** try different sizes of tubing in the water flow apparatus, we **should find** that the water flowed at very different rates. 如果我们在输水装置中试用不同尺寸的管子, 我们就会发现水的流速大不相同。
- ④ If you **should move** a permanent magnet in and out of a coil of wire, you **would be using** the magnet and the coil as a simple electric generator. 假设你把一个永久磁铁在线圈里移进移出, 你就是在用磁铁和线圈作为简易的发电机了。
- ④ If you **could make** a row of copper atoms by placing one next to the other, you **might need** 100 million to cover an inch. 假如你能够把铜原子一个挨一个地排列起来的话, 也许要 1 亿个才会排满 1 英寸。

★比较常见的是采用连词 if 的虚拟语气非真实条件句。在翻译这种条件句时, 除了在条件从句中通常要使用表示假设的连词**如果…(的话)**、**假使**、**倘若**等以外, 在表示结果或推论的主句中常须使用**就**、**会**、**也许**等词来表达虚拟语气。

★在虚拟语气中, 用一般过去时代替一般现在时, 用过去将来时代替一般将来时, 用过去完成式代替一般过去时, 用过去将来完成式代替过去完成式。

### 三、虚拟语气条件句翻译中应注意的问题

1. 虚拟条件从句中的连词 **if** 可以省略, 而将 **should**、**were**、**had**、**could** 等提到主语前面, 借倒装句表示虚拟语气。

- ④ Had the production process not been made all automatic one, the productivity would not have increased so greatly.  
假使生产过程没有实现自动化的话, 生产率不会这样大幅度地增长。
- ④ Were metal bonds ionic, they would be brittle and could admit of neither malleability nor ductility. 假如金属键是离子键, 金属就会是脆性的而不可能有延展性。

2. 除 **if** 外, 在虚拟条件从句中, 也可使用如 **unless**、**once**、**granted**、**so that** 等表示**假设**的连词。

- ④ **Unless** this part had been overheated, it **would not have failed**. 除非这个零件过热了, 否则它就不会损坏。
- ④ You may go where you like **so that** you are back by dinner time. 你可到任何喜欢去的地方去, 只须(只要能)在吃饭时回来。

3. 由表示建议、命令、要求、希望、假定等意义的动词(如 **assume**、**suppose**、**suggest**、**wish**、**order**、**require** 等)所引起的宾语从句或主语从句中, 可使用虚拟语气。

- ④ **Suppose** that you **could magnify** one atom so that it become as large as a big room. 假定你可以把一个原子放大得象一个大房间那样大。
- ④ I **wish** I **could take** a trip to the moon. 我希望(我)能到月球去作一次旅行。
- ④ It is **assumed** that the resultant force on the body **should be** zero. 假设作用在这个物体上的(合)力等于零。
- ④ It is **required** that all members(**should**) **be** present. 要求全体人员出席。

4. **necessary**、**important**、**possible**、**desirable**、**essential**、**imperial**、**natural**、**strange** 等有关的主语从句 (**It is necessary that…**一类句型)中, 也可使用虚拟语气。

- ④ **It is necessary that** the metal **should melt** at lower temperature.  
必需(的条件是)该金属能在较低温度下熔化。
- ④ **It is strange that** the wheel **should turn** so slowly. 真怪, 这个轮竟转动得这样慢。

5. 在包含有表示否定意义的介词或短语介词 (**without**、**but for**、**besides**、**in the absence of** 等)

的简单句中，也可使用虚拟语气。

④ **Without** the heat of the sun, nothing could live. (要是)没有太阳的热，什么也活不成。

④ **But for** the atmosphere we should die. (如果)没有大气，我们就得死。

6. 利用连词(or、otherwise、lest、in order that、so that)引出的并列分句或目的状语从句中，有时可使用虚拟语气。

④ Steam pipes must have expansion joints **or (otherwise)** the strain produced at high temperatures **would cause** leaks in the pipe. 蒸汽管必须有伸缩接头，否则高温下产生的应变**就会**使管子漏损。

④ Care must be taken in using this method **lest overflow should occur**. 使用这种方法时必须注意，以免发生溢流。

④ Sulphur dioxide is given off when the sulphite ores of metals are treated **in order that** the metal **may be obtained**. 处理金属的亚硫酸盐矿石时要释放出二氧化硫，以便获得金属。

④ They climbed higher so that they **might get** a better view. 他们登得更高，以便看得更清楚些。

7. 用 **as if** 或 **as though** 引导的表语从句或状语从句中，通常使用虚拟语气。

④ Things far off look **as if** they **were** smaller than they really are.  
远处的物体看来**好像**比它们的实际尺寸小些。

④ In fact the hole appears to move in response to an applied electric field, **as though** it were a particle exhibiting both a positive charge and a positive mass. 实际上空穴似乎是随外加电场的作用而运动，**好象**它是带正电荷和具有正质量的粒子那样。

8. 在某些句子中，根据其内在含义或上下文，亦可使用虚拟语气。

④ Space travel **would help** us to learn much more than we know now.  
宇宙旅行**会**帮助我们学到比现在所知道的多得多的东西。

④ **Reduce** the sun to the size of a football, the earth **would then be** the size of a grain of sand.  
把太阳缩到足球那么大，那末地球就只有砂粒那样小。

④ Arcturus is 200 million million miles away, and **to feel its heat you would have to be able to feel** the warmth of a candle from a distance of 5 miles. 大角星在 200 万亿英里以外，若要感觉到它的热，**你就要**能够感觉出 5 英里外一支蜡烛的热量。

## 第 7 节 情态的表达

►情态动词用于表示说话人的**意志、愿望或判断**，从而体现出当时的语言情景和主观态度。翻译时，要正确地表达原文语句的情态，就必须正确理解和翻译这类助动词。

►情态动词类型：may, might; can, could; must; ought; need; shall, should; will, would; used to。

### 一、May 和 Might 的译法

1. 表示许可(陈述句中)或请求(疑问句中)

►在肯定句中的 may 或 might 可译为**可以、好**。

►在否定句中 may not 可译为**不可以**(实际上较少用 may not, 而往往代之以 can't 或 couldn't, 这时仍译为不可以)。

►在疑问句中，may (might)……? 可译为**好……吗?或可以……吗?**

④ May I stay here a little longer? 我可以在此停留得稍久些吗?

④ Yes, you may. 是的，你可以留得久一些。

④ No, you may not (can't). 不，你不可以在此久留。

2. 表示可能

►在肯定句中的 may 译为**可能、会**；might 译为**也许、或许**；may have+过去分词译为**可能已经、或许已**。

➤在否定句中 may not 译为可能不; might not 译为也许不、或许不; may have not+过去分词译为可能还没有、或许尚未。

➤在疑问句中 may...?译为可能……吗?; might...?译为也许会……吗?

☞ **May** he come this evening?今晚他可能来吗?

Yes, he **may**. 是的, 他可能(会)来。

No, he **may not**. 不, 他可能不来。

☞ This is because, at such temperature sufficient diffusion **may** take place, while the metal is not too soft. 这是因为在这种温度下, 当金属还不太软的时候, 会发生充分的扩散。

☞ He **may** have tried every means. 他可能已经试用了各种方法。(may have...和 might have 都是表示现在对过去事物的判断)

### 3. 表示命令

➤在肯定句中 may 译为可以。

➤在否定句中改用 need not(不必)、can not(不可)或 must not(不要, 不得, 不许)。

☞ You **may** look at the things exhibited, but you **must not** touch them.

可以观看所展出的东西, 但是不要摸它们。(或“展出品任凭观看, 但不得触动。”) )

### 4. 表示劝告

📖 一般用 might 不用 may, 以使语气委婉。

📖 在肯定句中 might 译为 (大)可以; might have...译为早可、本可、原可;

📖 在否定句中 might not 译为可不; might not have...译为早可不, 本可不, 原可不。

☞ You really **might** do it for me. 真的你大可以代我做(这件事)。

☞ You really **might have done** it long ago. 你确实老早前就可以做这件事。

### 5. 表示目的

📖 现在时或将来时用 may; 过去时用 might。如果 might 用于现在或将来时, 则构成虚拟语气, 表示较大的不肯定。

📖 在肯定句中, may 和 might 都可译为以期、以便、以使。

📖 在否定句中, 如为陈述语气, 则 may not 和 might not(过去时), 都可译为以免、使不致; 如为虚拟语气, 则 might not 应译为也许不致。

☞ Cables are usually laid underground (in order) that their life **may** be prolonged.  
电缆通常铺设在地下, 以期延长它们的使用期限。

☞ I say all this that you **might** understand better.  
我说明这一切, 使你(也许)能了解得更清楚一些。(表示虚拟)

☞ We started early that we **might not** be late. 我们提早动身, 以免迟到。

### 6. 表示愿望

📖 在简单句中 may 可译为祝或省略不译。

📖 在主句动词为 hope, wish 附宾语从句中, may 及 might 译为可、能或省略不译。这都属于虚拟语气的用法

☞ She wished she **might** surpass you. 她但愿(她)能超过你。

### 7. 表示让步

📖 这时 may(表示现在或将来)可译为可、尽管 (不管)、哪怕或省略不译。

📖 当主句为现在时时, 从句中的 might 可译为也许或不译, 表示较大的不肯定(虚拟语气)。

📖 若主句为过去时, 从句中的 might 可译为可能、会或省略不译 (陈述语气)。

☞ No matter how hard a solid **may** be, we can change its shape. 不管一种固体如何坚硬, 我们总能改变它的形状

☞ He **may** be a great scholar, but he is not a good teacher. 他可能是个伟大的学者, 但他不是个优秀的教师。

☞ Whatever **might** happen, they were determined to do the work. 无论发生了什么事情, 当

时他们都下定决心去做那项工作。

④ I can (could) not help it even if you **might** not like it. 也许你不喜欢它, 我也没有办法。

→might 与 even if 或 even though 连用时, 后者可不译出

## 8. 表示假设和推测

④ 无论在真实条件句抑或非真实条件句中, may 或 might 都可用来表示由某种假设条件推断的结果。这时, 在肯定句中可译为也许、或者、可能(可以); 在否定句中可译为不致。

④ might have... 表示对过去事态的单纯的设想或推测, 可译为或许已经、早可(本可, 原可); might not have... 可译为不致已经。

④ If he arrives here, he **may** come to help us. 如果他(现在)到达这里, 他也许来帮助我们。(真实条件句)

④ If ..., complete desulphurization and oxidation of the pellets **might** have occurred. 假如..., 或许已经发生球团的完全脱硫和氧化了。(非真实条件句, 表示与过去的事实可能相反。)

④ If he were to consider the new factors, he **might** get a different conclusion. 假如他考虑这些新因素, 他可能得出不同的结论的。(非真实条件句, 表示与将来的事实可能相反。)

④ It **might** have caused the motor to be seriously damaged. 这或许会(或许已经)造成马达严重损坏。(单纯推测)

## 二、Can 和 Could 的译法

### 1. 表示能力或可能性

④ Can(指现在或将来)和 could(指过去)可用来表示有能力去做某项工作或有可能发生某件事。

④ 这时, 在肯定句中可译为能(可)、会、肯;

④ 在否定句中译为不能(不可)、不会、不肯;

④ 在疑问句中译为能不能...?(能...吗?)、会不会...?(会...吗?)、肯不肯...?(肯...吗?)”

④ Air can be compressed into a smaller volume. 空气体积可以压缩得小一些。

④ Can you speak English? 你会说英语吗?

④ Can you lend me your dictionary for a week? 你肯不肯把你的字典借给我用一个星期?

### 2. 表示允许或禁止

这时 can 译为可以, cannot 译为不能(不得); can...? 译为可否...?, could...? 的译法相同, 但只能用于间接叙述法中。

④ Can I use this instrument? 我可以使用这台仪器吗?

Yes, you can. 是的, 你可以使用。

No, you cannot. 不, 你不能使用。

④ He was told that he could not use this instrument. 被告知不得使用这台仪器。

### 3. 表示怀疑或不肯定

④ 仅用于否定句或疑问句中。这时 cannot 和 could not 译为决不(决非)、决无(决没有)。can...? 译为难道...吗? could...? 译为会...吗? cannot have... 译为决不会...; could not have... 译为不至于...。can have...? 译为难道...过吗?

④ Can it be true? 难道这是真的吗?

④ it cannot be true. (这)决非真的(或决不正确)

④ I cannot have said so. 我决不会这样说的(或: 我决没有这样说过)

### 4. 表示假设

④ 在虚拟语气的用法中, could 应译为能(会); could not 应译为不(可)能、不会; could...? 应译为能(会)...吗?。

④ 在表示与过去事实相反的虚拟条件句中, 要使用 could have..., 译为本来会、原本能。



- ☉ If there were no carbon dioxide in the nature, plants could not thrive.假如自然界中没有二氧化碳的话,植物就不可能生长。
- ☉ He **could have** finished that work if it had not rained.  
要是天不曾下雨,他**本来会**完成那件工作的。

### 三、Must 的译法

#### 1.表示必要、需要、责任和义务

- 📖 在肯定句中译为必须(需要)、一定要。
- 📖 在否定句中不用 must not, 而代之以 need not, 译为不必、无需。
- 📖 在疑问句中 must...?译为必须(需要)...吗?或一定要...吗?
- ☉ Must I answer this question? 我必须回答这个问题吗?  
Yes, you must answer it. 是的,你必须回答它。  
No, you need not. 不,你不必回答

#### 2.表示决心

must 译为一定要; must not 译为决不; must...? 译为一定要(必须)……吗?。

We must work hard to construct a new socialist China.

我们一定要努力工作,建设社会主义新中国。

#### 3.表示命令或禁止

这时 must 译为必须(务必)、一定要; must not 译为不得(不许)、决不要(切勿)。

You **must not** be late for your lessons. 你决不要上课迟到。

#### 4.表示必然结果: 仅用于肯定句中, 译为必(然)、一定。

- ☉ Bad seeds must produce bad corn.恶因必生恶果。

#### 5.表示推断

- 📖 must 是推测现在或将来某事必然发生,可译为想必(谅必)、准定会;其否定句应为 can not, 可译为决不、决非。
- 📖 must have...是推测某事在过去一定已经发生(但有轻度不肯定意味),可译为谅已(一定已经)、必然;否定句应为 cannot have..., 可译为决不会。
- ☉ Since air has weight, it must press down on the surface of the earth. 既然空气具有重量,地球表面想必受到它向下的压力。
- ☉ In this way, it is possible to decide how many electrons the atom must have lost to produce each different type of ion. 这样,就能够断定产生各种类型离子时原子必然失去的电子。

#### 6.表示假定

- 📖 用于虚拟语气条件句的主句中,表示由一定假设条件所必然引起的结果。这时 must have...译为一定早已; must not have...译为一定尚未。
- ☉ He must not have reached Beijing. if he had missed the train. 他如未赶上火车,就必然还没有到达北京。

#### 7.表示颠倒

- 📖 表示与说话者的愿望和计划相反的事。这时 must 译为偏偏; must not 译为偏不。
- ☉ As I was not ready for recitation, I must be called up to answer questions.  
我没有准备课堂检查,偏偏叫我起来回答问题。

### 四、Ought 的译法

ought to+原形动词表示应该做的或理应发生的事情。

#### 1.表示需要、义务或劝告

仅用于现在或将来时,这时 ought to 译为应该(应当)、该; ought not to 译为不应(不该); Ought to...? 译为应不应该(当)……?或(应)该……吗?



You ought to fulfill your duties. 你应该尽到你的义务。

## 2. 表示推断或不肯定

这种用法相当于 must 和 should, 表示说话者的假设和推断。这时 ought to 译为该; ought not to 译为该不; ought to have... 译为早该。

- ④ The time is over, you ought to be finished. 时间到了, 你该准备好了。
- ④ Since these gases are not chemically combined, it ought not to be a difficult matter to separate them. 由于这些气体没有化合, 所以把它们分开该不是一件难事。

## 3. 表示责备

使用 ought to have... 的形式, 在肯定句中译为本该, 在否定句中译为本不该。

You ought to have finished that work yesterday. 你本该在昨天完成那件工作的。(实际上并未完成)

## 五、Need 的译法

►Need 也用来表示需要或义务, 但比 must、ought 的语气轻一些, 并且较常用于否定句和疑问句中。在肯定句中一般不算是情态动词。

►Need 可译为需要、要; need not 译为不必、无需 (指现在或将来)。

►need not have... 译为本不必、原无需 (指过去)。

►如果 need 前面有助动词 do 时, need 就不再是情态动词了。

- ④ You **needn't** come here tomorrow. 明天你不必到这儿来。(将来时)
- ④ To be called an impurity, the foreign matter **need not** be dirty. 称为杂质的外掺物质倒不一定是脏的。(现在时)
- ④ **Need** he do this test now? 他现在必须(需要他现在)作这项试验吗? (现在时)。
- ④ This is all that **need** be said. 这就是(需)要说的一切了。(在肯定句中, 当含有高度限制性或否定意义时, need 可用作情态动词。)
- ④ He **didn't need** to go there yesterday. 昨天他没有必要去那里。(实际上也确实没有去)

## 六、shall 和 should 的译法

用于第一人称时, shall 可构成各种将来时态, 起助动词的作用。用于第二、三人称时, shall 是情态动词。

### 1. Shall 的用法和译法

📖 表示命令、决定或建议: 这时 shall 可译为必须、(须)要 (用在从句中时, 有时可省略不译); shall not 可译为不要、不得、不许 (不准)。

- ④ You shall go there at once. 你必须立刻去那里。
- ④ You must knock down the machines before shipping in order that they shall arrive in good shape. 在装运这些机器之前, 必须把它们拆卸开来, 以使之完整无损地运到目的地。(因主句中的 must 已译为必须, shall 省略不译。)
- ④ Shall not smoke here! 此处不许抽烟!

### 2. Should 的用法

➔ 表示命令、决定或建议

这种用法和 shall 相同, 代表说话人的意见表示应该做的事情或应当会发生的事情, 但语气较为委婉, 也不一定指过去时间。这时译为应当、应该; should not 译为不应当或不该。

When a hydrometallurgical process is developed to the same stage, it should be compared not to a conventional, though modified smelter but to the various improved pyrometallurgical processes which were available at that time. 当一种湿法冶金方法发展到上述阶段时, 不应当把它同传统的 (即使经过改进的) 熔炼炉相比较, 而应当同当时能够应用的各种先进的火法冶金方法相比较。

### →表示惋惜或责备

should have+过去分词表示本应当在过去做到的事情而没有做到，在否定句中则表示过去做了本来不该做的事情，都带有惋惜或责备的意味。可译为**本(来应)当**或**本不该**。

She should have been more careful. 她本当更仔细一些的。(而实际上她却是不仔细的)

He should not have gone out. 他本不该出去的。(而事实是他出去过)

### →构成虚拟语气

在条件句中或其它带有虚拟意味的句型中，可用 should 构成虚拟语气。

➤ 当用于**主句**中时，should 表示在所假设的条件下可能会做的事情或应该会发生的事情，可译为**会**，就(会)；should have +过去分词表示过去在所假设条件下可能会做的或应该会发生的事情，可译为**本来会**。

➤ 当用在**条件状语从句**中时，可译为**能**或省略不译。

➤ 当用在**主语从句**中表示惊奇时，可译为**竟会**、**居然**；在其它情况下可根据上下文译为**必须**、**应当**等。

☉ If I had time, I should help you? 如果我有时间，我会帮助你的

☉ If we had known the basic principles, we should have controlled the process even better.  
假如当时我们知道这些基本原理，我们本来会更好控制这个过程的。

☉ If he should come to us, he would answer these questions.  
假如他(能)来我们这里，他会回答这些问题的

☉ It is surprising that our calculations should be so accurate.  
令人惊奇的是，我们的计算竟然(会)如此准确

☉ We demand that the results of an experiment should be checked.  
我们要求必须核对实验结果。

### →表示谦逊、客气和委婉语气

这种用法常用于第一人称，可译为**倒是**

We should like to do another experiment. 我们倒是很想再做一次实验。

## 七、will 和 would 的译法

### 1. Will 的译法

#### ➤表示意志或愿望

这时 will 是表示**主语的意志**，而不一定是说话人的意志，可译为**要**、**想**、**愿**、**就**。

I will go, if you wish. 如果你希望我去，我就去。(或：如果你希望的话我愿去)

He will do everything possible to help us. 他要尽一切可能来帮助我们。

#### ➤表示倾向或惯常性动作

在科技文献中常用 will 表示在一定条件下会发生某种必然的倾向，可译为**会**；如表示**惯常性动作**，则可译为**总是**、**经常**。在否定句中可译为**不会**或**总是不**、**说什么也不**。

Ice will melt when it is heated. 冰受热即会融化

Iron powder will burn in air at high temperature. 高温下铁粉在空气中会燃烧。

Copper will not replace the hydronium ion in solution. 铜并不(会)置换溶液中的水合氢离子

The valve will open and close at regular intervals. 阀门(经常是)每隔一定时间启闭一次

#### ➤表示揣测或推断

这时 will 可译为**多半**、**可能**，will have+过去分词可译为**谅必已经**。

☉ This machine does not operate so normally, it **will** be the one imported from abroad.

这台机器操作得不怎么正常，它**多半是**进口的那台吧！

☉ You will have heard about it. 这事你**谅必**已经听说了。

### 2. Would 的用法

#### ➤表示意志或愿望

和 **will** 同义, 但语气较为婉转; 在疑问句中则表示**比较客气的要求或希望**, 可译为愿意、要、可以等。

I would recommend this method to you. 我愿意把这种方法介绍给你。

The slag produced during the flash smelting process would be slowly cooled, crushed, ground to-200 mesh, and floated for recovery of the contained copper. 用闪速熔炼法炼铜时产生的炉渣要缓慢地加以冷却, 而后破碎、磨碎到-200 网目, 并进行浮选, 以回收其中所含的铜。

►表示推测或判断

常用 **would** 表示按照规律应当产生的结果、据推测大概会发生的事情或某事物所具有的倾向性特征。译为应当(是)、会、可能等。

A voltmeter connected across AB would read 6 volts while one across CD would read 18 volts. 接在 AB 之间的伏特计的读数应当是 6 伏, 而接在 CD 之间的伏特计的读数应当是 18 伏。

The needle would remain horizontal on the magnetic equator. 磁针在地磁赤道上会保持水平

Short circuits would cause very strong currents to flow. 短路会使得很大的电流流过。

►表示过去惯常性动作

和 **used to** 类似, **would**+原形动词也可表示过去惯常发生的事情, 区别在于前者表示频率极高的或十分经常的动作, 而后者则表示频率不太高或不十分经常的动作。这时 **would** 可译为(经)常、时常。

In such cases, we **would** go to the old workers for help. (过去)遇到这样情况, 我们►找老工人帮助。(这种用法不属情态动词范围)

►构成虚拟语气

在条件句的主句中, 可用 **would** 构成虚拟语气, 表示在所假设条件下可能产生的结果。这时 **would** 可译为会、就; **would have**+过去分词可译为就会、本来会(原本会)。

❶ The powerful electric currents that flow through these large transformers would make them very hot were they not kept cool by being placed in a bath of oil. 假如不把这些大型变压器放在油槽中使它们得到冷却的话, 流过这些变压器的强大电流就会使它们大大发热。

❷ Many different methods have been employed which would have yielded isomeric bromobenzenes if such were possible. 假如能够生产同分异构溴苯的话, 所已采用的许多不同的方法本来会生产出这种溴苯的。

## 第 7 章 介词的翻译

### 第 1 节 介词的类型及一般译法

介词亦称前置词, 是置于名词性词语或从句(包括代词、数词、动名词及名词从句)之前、表示句中不同成分之间的关系的词类。

#### 1. 介词分类

📖 单个介词 一个单词, 如 **at**、**by**、**with** 等。

📖 短语介词 由两个以上介词(中间加有或没有其它词)组成、总起来起一个介词作用的短语, 如 **from among**(从…当中)、**to the extent of**(在…范围内)、**with respect to**(对于)等等。

#### 2. 介词的翻译方法

►直译

We can't see clearly **for** the fog. 因为雾的缘故我们看不清楚。

Air and water are the most abundant substances **in** nature. 空气和水是自然界中最丰富的物质。

The density **of** this mixture is 7.5 grams per cubic centimeter. 这种混合物的密度为 7.5 克/厘米。

There appears a sine wave **on** the screen. 荧光屏上出现了正弦波。

►改译

Three from eight leaves five. 八减三余五。

The rollers rotate in opposite directions. 轱轮以相反方向转动。

We were trying to know the properties of the semiconductor materials of necessity.

由于需要, 我们曾力图了解半导体材料的性能。

They have made many experiments on the production of fibre-reinforced composites. 他们已作了多次关于生产纤维增强复合材料的实验。

With more active catalysts, the reaction is carried very completely.

由于使用活性较大的催化剂, 反应进行得很完全。

➤省略

Concrete itself is only good at resisting compression, but it fails under tension. 水泥本身仅善于抗压而不善于抗拉。(at 省略, under 则属改译)

What is the difference between a mixture and a compound? 混合物和化合物(之间)的差别是什么?

The new type electrical machine has worked well for several years. 这台新型电机已正常工作好几年了。(for 省略)

New boosters can increase the payload by 125%. 新型助推器能把有效负载提高 125%。(by 省略)

With most machines maintenance is necessary. 大多数机器需要维修。(with 省略)

## 第 2 节 介词短语的译法

### 一、判明语法功用

要找出同该介词(短语)发生关系的词才能据以判明该介词短语的语法功用:

➤同行为动词(包括非限定动词)发生关系时, 是状语(或则当该动词同这个介词构成短语动词时, 介词宾语可看作该短语动词的宾语)

➤同连系动词发生关系时是表语

➤同名词发生关系时是定语

➤同形容词发生关系时是补足语或状语

➤同副词发生关系时是状语

➤有的动词和一定的介词连用, 组成短语动词

➤有些形容词(包括用作形容词的分词)、副词或名词也要求一定的介词。

characteristic of... ...所特有的;

different from 不同于...的, 与...不同的

subject to... 服从于...的;

uniform to... 均匀到...(程度)的

apart from... 且不说; 除开...以外;

out in... 在...上发生错误

upwards of... 超过; ...以上;

well on into... 一直继续到...

application to... 施加于..., 对...的应用;

influence on... 对...的影响

protection from... 对...的预防;

transformation into... 转换成...

★Some studies indicate that recrystallization **in tungsten** occurs **by growth of polygonized subgrains** and **by strain-induced grain boundary migration**. 某些研究表明, 钨的再结晶是由于多边形化亚晶粒的长大和由于应变引起的晶界迁移而发生的。(in tungsten 和其前的 recrystallization 发生关系, 起定语的作用; 两个由 by 引起的短语都是和谓语动词 occurs 发生关系, 所以都起着状语的作用, 且其中的 of... 是 growth 的定语。)

★For lathe turning the following tool geometry is recommended. 对车削加工而占, 建议采取如下的工具几何形状。(for... 与谓语动词也可说是与全句发生关系, 起状语的作用。)

★The printed circuit plate **is of good quality**. 这块印刷电路板质量好。(of... 与 is 发生关系, 起表语的作用)



★A motor is **similar to a generator in construction**.在结构上电动机类似于发电机。(to a generator 与 similar 发生关系,起表语补足语的作用;in construction 也与 similar 发生关系,但起状语作用。)

★They always **keep** the emergency generating **set in order**. 他们总是保持备用发电机组处于随时可运转的状态(in order 与 keep...set 发生关系,起宾语补足语或状语的作用。)

## 二、选择不同译法

### 1.译为短语

- ④ **For some years** Carbolite has been reducing the amount of asbestos used. 几年来, 卡里波特公司一直在减少所用石棉的数量。
- ④ The overhead wires hang **from huge porcelain insulators**, which are concertina-shaped in order to reduce the effects of dirt and damp **in causing leakage of electric current**. 架空输电线悬挂在巨大的瓷质绝缘子上, 绝缘子为手风琴形, 以减少脏污和湿气对造成电流漏泄的影响。(from 意译为在...上; in order to 译为以, 用来引出目的状语; 而 of dirt... 和 in...两个介词短语都是 effects 的定语。)
- ④ **In consequence of** these forces, and the repulsive forces which occur **between** all ions or molecules when they get so close **to** one another that their electronic structures are **in contact**, the ions pile up together **in a regular** way, each sodium ion surrounding itself **with** six chloride ions as nearest neighbors, and keeping all other sodium ions somewhat farther away. 由于这些力(的结果), 也由于当离子或分子[彼此]接近得使它们的电子结构接触时所产生的排斥力的结果, 离子以规则的方式堆积在一起, 每个钠离子的周围有六个氯离子作为最近的邻居, 而和其它钠离子保持略远一些的距离。
- ④ **Without** moving parts, maintenance requirements are cut **to** a minimum. 由于没有转动件, 所需维修工作量可减少到最低限度。

### 2.译为状语从句

- ④ The results are nevertheless beyond dispute, **thanks to** the accuracy of the physical methods of measuring the characteristics of the electrons and alpha particles shot off from these spontaneously exploding nuclei. 所得结果仍然是无可争议的, 因为用以测量从这些自爆裂原子核中射出的电子及α粒子的特性的物理方法是精确的。(thanks to 到句末为一介词短语, 译为原因状语从句。)
- ④ **With** the carbon content exceeding 1.40%, a weak and brittle steel results, developing properties similar to cast iron. 由于含碳量超过 1.4%, 结果得到脆弱的钢, 其性能和铸铁相类似。(with...1.40%译为原因状语从句)
- ④ **With** the machine warmed up, the insulation resistance will normally be lower. 随着机器的发热, 绝缘电阻通常会降低。(with...up 译为时间状语从句)
- ④ The resistance of this metal is too high **for** us to use it as a conductor of electricity. 这种金属的电阻太高, 所以我们不能用它作导体。(for... electricity 译为结果状语从句)

### 3.译为并列分句

- ④ In the model, the floating ice was represented by pieces of plastic material, **about** the correct density and average size of floating blocks of ice in the river. 在模型中, 浮冰用一些塑料块来代表, 塑料块具有与河流中浮冰块大致相同的密度和平均尺寸。(about...river 译为并列分句)
- ④ The basal mineral salts medium of Silverman and Lundgren (1959) was employed **with** chalcopyrite concentrate replacing ferrous iron as the energy source. (我们)使用的是 Silverman 和 Lundgren(在 1959 年发表的文献中介绍过)的基本矿物盐介质, 但用黄铜矿精矿代替二价铁作能源。(with...source 改译为并列的无人称分句; 注意译文中添加了一

个连词但。)

- ④ However, steel is made, and will be made, everywhere in the world, not predominantly in Western Europe as in the past, **with** steel from every part of the world taking part in severe international competition. 但是, 钢现在和将来都是在世界各地炼制, 而不象过去主要是在西欧 炼制, 并且世界各地生产的钢都参预国际上的激烈竞争。(with...competition 改译为并列分句,并添加连词并且。)
- ⑤ In a generator mechanical power is put in and electrical power is taken out, **instead of**, electrical power going in and mechanical power coming out as in a motor. 在发电机中是输入机械能, 输出电能; 而在电动机中则是输入电能, 输出机械能。(instead of...motor 改译为并列分句)

### 三、在翻译介词短语时须注意的问题

➤ 在一些特殊疑问句中; 在由连接代词或连接副词引导的名词从句中; 在某些定语从句(关系代词用作介词宾语时)中; 以及在一些短语动词的被动形式中, 介词短语被分割开来, 即介词不放在它的宾语的前面, 而移到句子的末尾。这种前后分开的介词短语, 仍然可以参照上述译法加以翻译。

- ④ **What** are atoms **composed of**. 原子是由什么组成的?(of 的宾语 **what** 因语法的要求而移到句首)
- ⑤ Electric power is **what** we are badly in **need of**. 电力是我们迫切需要的。(表语子句中 **what...need** 是 of 的宾语)
- ⑥ The oil (**that**) the aeroplane is oiled **with** must be of good quality. 飞机用的润滑油必须是高质量的。(with 的宾语是 **that**)
- ⑦ A modern air conditioning **equipment** has been equipped **with** in the factory building. 厂房里已安装了现代化的空气调节设备。(with 的逻辑宾语是 **equipment**)

➤ 当有两个以上介词短语连用在一起时, 要特别注意辨明它们的语法关系, 以免错译。

- ④ **Resistance** of experimental steels tested **to** sulfide stress cracking. 所试验实验钢(种)的耐硫化物应力腐蚀性。(of...和 to...都是 **resistance** 的定语; 错译: 对硫化物应力腐蚀进行试验的实验钢的强度。)
- ⑤ The **effect** of A **on** B. A 对 B 的影响。
- ⑥ The **substitution** of A **for** B. 用 A 代替 B (可以认为 of A 和 for B 都是 **substitution** 的定语; 错译: 对于 B 的代替 A)

➤ 有的介词短语, 特别是某些短语介词, 已变为英语中的成语, 而具有特殊的意义, 如: after All、before long、for instance、in time、to the point of 和 as by、as for、behind in、in the matter of、upon the point of 等等。这些带有介词的短语, 不可照字面直译, 不懂时要查阅字典。

## 第 3 节 常用介词的译法

### 1. about

➤ 关于

- ④ By studying benzene we shall learn a great **about** the characteristics of all aromatic compounds 通过对苯的研究, 我们将了解到许多关于所有芳香族化合物的特性。
- ⑤ This paper is **about** hydrometallurgy. 这篇论文是关于湿法冶金。

➤ 围绕(在...周围)

- ④ The wheel turns **about** its axle. 轮子围绕着它的轴旋转。

➤ 大约

### 2. according to

通常可直译为按照、依据。但在科技文献中常遇到在其后跟着人名或公司名的情况, 这时



往往需要译为**按照……的意见(观点、看法)**。

According to Arthur Lee, iron foil should not be considered as just another variety or form of the many alloys and metals currently available. **按照** Arthur Lee 公司的**意见**铁箔不应当仅仅看作是  
是目前可以使用的许多合金与金属的另一变种或形态。

➔according to 有时可用来代替 depending on, 表示视(依)…而定(多用在句末)。

The metal loss may be 6~10% according to the process used. 金属损失可为 6~10%, 视所用方法而定。

### 3. After

➤表示时间、空间、顺序上的在…之后。

After having been discussed the report will be published.这份报告在经过讨论之后将予以发表。

➤表示按照、仿效。

These trials were carried out after our own experiments.

这些试验是根据我们自己的实验(结果)进行的。

The measuring unit of an electric current ampere was named after the French scientist Ampere.

电流的计量单位-安培是以法国科学家 Ampere 的名字命名的。

➤表示追求、寻找。

The geological explorers went out after new mineral resources day by day.

地质勘探人员天天外出寻找新矿源

➤表示原因, 可译为由于。

After the experience we have gotten from the failure, we shall certainly succeed.

由于我们从失败中取得经验, 我们一定会成功。

### 4. against

➤表示运动方向或所处位置的相反、相对。

The effluent is cooled against the feed. 流出物被(对面进来的)给料所冷却。

The workshop is situated against our laboratory. 车间正好在我们实验室的对面。

➤表示两种事物的相互抵触, 可译为违反、反对、不利于。

At higher silicon level the amount of flux also increases proportionately with the result that the time and temperature conditions are against lime solution. 在(铁水中)硅含量较高时, (炼钢用)熔剂的数量也要成比例地增加, 以致时间和温度条件不利于石灰的溶解。

➤表示两种东西相互接触、摩擦或凭靠, 可根据情况翻译。

The slip-rings connect the rotating coil to two carbon brushes which are pressed against them by springs. 汇电环把旋转线圈连接到两个碳刷上, 后者是用弹簧紧压到汇电环上。

There is a ladder standing against the wall. 有一张梯子靠在墙上。

➤表示对比、参照或依据。

The pump cannot perform stepless variation of flow against pressure. 这种泵不能使流量按压力实行无级变化。

The crude steel production is 30 million tons this year, as against the 25 millions tons of last year. 今年的原钢产量为 3000 万吨, 而去年只有 2500 万吨。

Hydro-power engineers are customed to balancing the cost of the concrete lining of a tunnel against the cost of energy loss caused by rough unlined tunnels. 水电工程师习惯于把隧道的混凝土衬筑费用同由于隧道未加衬筑而引起的电能损失(的费用)进行对比而加以平衡。

★Both these cost advantages must be weighed **against** the additional investment required for the screen effluent splitter. 这两种费用上的节约都必须在考虑到筛式废分离机所需的额外投资的基础上进行权衡。

★A is plotted **against** B in Figure 1. 图 1 中绘示了 A 与 B 的关系(曲线)。

★A plot of plating rate **against** current density shows the former to pass through a maximum at 2 to 3 A/dm<sup>2</sup>. 电镀速率-电流强度关系曲线图表明, 在 2~3 安/分米<sup>2</sup> (的电流强度)下电镀速率可达到最大值。

➤表示防止、以备。

Aluminum foils are used as barriers **against** water-vapor transmission in food package.

铝箔是用作食品包装中的防潮层。

They must save fuel **against** the day of battle. 他们必须节省燃料, 以备战时之用。

## 5.as

➤用作介词时的基本意义是作为。

➤由介词构成的介词短语大多起宾语补足语或主语补足语的作用, 翻译时根据具体情况, 可译为作为、是、按、成(为)、以…状态, 等等。

- ④ It has been proved that copper is vital **as** a trace element in the soil. 已经证明, 铜作为土壤中的微量元素是至为重要的。
- ④ In this way, the carbon is entirely consumed in the process and does not have to be disposed of **as** a by-product or effluent. 这样, 碳就在此过程中全部消耗掉, 从而不必作为副产物或排出物加以处置了。
- ④ There was no doubt that everybody considered the furthering of researches and applications of rock mechanics **as** the most urgent task for all dam designers. 毫无疑问, 每个人都认为促进岩石力学的研究和应用是所有坝工设计人员(当时)最迫切的工作。
- ④ The amount of titanium taken into solution was determined at hourly intervals and expressed **as** a percentage of the amount present in the original ilmenite. 进入溶液中的钛量每(隔一)小时测量一次, 并用占原始钛铁矿中钛含量的百分数来表示。
- ④ Potential acidity is the free acid plus the acid combined **as** titanyl sulphate. 潜在酸度为游离酸加上化合成硫酸钛氧的酸。
- ④ Of the total bituminous coal, only about 136000 Mt. or 55%, are estimated **as** recoverable under present mining technology. 在烟煤总储量中, 据估计只有 1360 亿吨(55%)(是)能用目前的开采技术开采出来(的)。
- ④ In Fig 9, tensile elongation is plotted **as** a function of temperature. 图 9 中绘示了拉力延伸率同温度的函数关系。
- ④ Limit clearances are to be taken **as** approximate values. 极限间隙可采取近似值(可作为近似值来采取)。
- ④ The 1-hour recrystallization temperature was determined **as** 2000°C. 一小时再结晶温度经测定为 2000 °C 。

## 6. at

➤表示空间中一点(地点、场所、距离、深度等)

- ④ All tensile specimens necked at fracture. 所有拉力试样都在断口处(断裂点)缩颈。
- ④ There are thirteen 2-in holes at 6-in centres. 有 13 个直径 2 英寸、中心距各为 6 英寸的孔。

➤表示时间上的一点(时刻、顺序、年龄等)

- ④ The meeting was held at nine o'clock yesterday morning. 会议是昨天上午九点开的。
- ④ The current starts flowing at the very moment when the circuit is closed. 电路一闭合, 电流就开始流动。

➤表示温度、速度、比率、价格等。

- ④ All tests were conducted at 600°C. 全部试验都是在 600°C 进行的。
- ④ The dump truck runs at the rate of twenty miles an hour. 这种倾卸式货车每小时行驶 20 英里。

➤表示动作的方向或目标。

- ② They took aim at great accuracy in developing a new self-controlling system. 他们在研制新的自动控制系统时的目标是高的精确度。
- ② The soldiers were shooting at a target. 士兵们在打靶。

➤表示所处状态或从事某项工作。

- ② Statics deals exclusively with bodies at rest. 静力学专门研讨静止的物体。
- ② There are always many workers at work every now and then in a large steel plant. 在大型钢厂中时时有很多工人在工作。

## 7. Beyond

➤表示位置上在…以外(以下)、在…的那边

- ② Our factory is three miles beyond the city. 我们的工厂离城市三英里远。

➤表示时间上过了…、在…以后

- ② The steel output of the whole world is more than 500 million tons in 1975 and beyond. 1975 年以后全世界钢产量超过了五亿吨。

➤表示范围上超过…、出乎…之外

- ② people can see the things beyond the visibility of them by radar. 人们利用雷达能看见视线以外的东西。

➤表示除…外

- ② We know nothing beyond this. 除此以外, 我们一无所知。

## 8. by

➤表示空间或位置上的接近, 可译为靠近、在…旁边、在…手边。

- ② The steelworks stands by the river. 钢铁厂位于河旁。
- ② They work by the furnace everyday. 他们每天在炉边工作
- ② Have you any data by you? 你手边有资料吗?

➤表示时间或时限, 在…期间、在…之前、到…、不迟于…。

- ② We work by day. 我们(在)白天工作。
- ② India's raw steel production is expected to reach 15 million tons by 1980. 到1980年印度原钢产量预期将达1500万吨。
- ② He will be here by ten o'clock. 他将在十点前来到这里。

➤表示从某一地物旁边经过, 可译为沿、经由、通过、经过等。

- ② For a long time it was not possible to diffract X-rays by matter, since the wave-lengths are much smaller than those of lights. 以往长时期内未能使x射线从物质旁边绕射过去, 因为其波长比光波长度小得多。
- ② He goes by your shop everyday. 他每天从你们车间旁边经过。
- ② There is a path by the river here. 这里有一条沿河小路。

➤表示行为方法(后跟动名词或动词性名词), 可译为通过…(的方法)

- ② Mechanical advantage can be determined by dividing the resistance by the effort. 通过用作用力除阻力(的方法)就可算出机械效益。
- ② Steel may be hardened by heating it to a certain temperature and then quickly cooling in oil or water. (通过)把钢加热到一定温度, 然后在油中或水中骤冷, 就可以将它淬硬。

➤表示原因, 可译为由于、因。

- ② The power output becomes lower and lower by overloading. 功率输出由于过负荷而越来越低。

➤表示行为的手段或工具, 可译为(利)用、(依)靠、借(助于)。

- ② The constituents of a mixture can be separated by mechanical means. 混合物的各种成分能用机械方法(手段)加以分离。
- ② Considerable heat is produced purely by chemical reactions in the melt during the blow. 单

纯地依靠吹炼过程中熔体内的化学反应, 就能产生大量的热。

② The two plates are held in close contact by spring pressure. 这两块板借弹簧压力保持紧密接触。

② We go to Shanghai by train. 我们乘火车去上海。

➤表示准则、标准、尺度或单位, 可译为凭、按照、根据、以…计算。

② We identify a substance physically by its color, odor, taste, solubility, hardness, density and the melting point. 在物理上我们是凭物质的色、嗅、味、溶解度、密度和熔点来鉴定它的。

② The electric voltage is measured by the volt. 电压用伏特来测量

② Air contains 19 per cent of oxygen by volume. 按容积计, 空气含氧 19%。

➤表示达到的或相差的程度。

② He becomes skilful at operating this machine by slow degrees.

他慢慢地变得能熟练地操作这台机器了。

② The bullet missed the target by one inch.

子弹以一英寸之差未打中目标。

➤在被动句中表示行为的主体。

② The machine is driven by electricity. 这台机器是由电驱动的。

➤表示加减乘除, 可根据情况译出。

② Cross-section size of the slabs was 1850 by 270 mm. 板坯的横断面尺寸为 1850×270 毫米。

② When several similar bulbs are joined in parallel their total resistance equals the resistance of one bulb divided by the number of bulbs. 把几个相同的灯泡并联时, 它们的总电阻等于一个灯泡的电阻除以灯泡的数目(所得的商)

② The effective value of current strength is equal to its greatest strength divided by the square root of 2, that is by about 1.4. 电流强度的有效值等于它的最大强度除以 2 的平方根, 即除以大约 1.4。

② Three increased by five is eight. 三加五等于八。

② Eight decreased by three is five. 八减三等于五。

➤表示增减的绝对值或倍数, 可不予译出。

② This raises the recrystallization temperature by 50~100°C. 这会使再结晶温度升高 50~100°C。

② The presence of F suppresses the extraction of B by ~10%.

氟的存在能把硼的萃取率降低 10% 左右。

② Taking 1970 as a pivot point, worldwide steel output, which rose 71 per cent in the previous decade, is expected to grow by 55 per cent in the one following. 取 1970 年为转折点, 在以前十年增长了 71% 的世界钢产量, 在以后十年中预料将增长 55%。

② The products must be inspected by 100 percent. 产品必须百分之百地加以检查。

② The apparatus under development will reduce the error probability by a factor of 5. 正在研制的仪器将使误差概率降到五分之一(减小五分之四)。

➤表示达到的或相差的程度

② He becomes skilful at operating this machine by slow degrees.

他慢慢地变得能熟练地操作这台机器了。

② The bullet missed the target by one inch. 子弹以一英寸之差未打中目标。

➤在被动句中表示行为的主体。

② The machine is driven by electricity. 这台机器是由电驱动的。

9. for

- 表示目的, 可译为为了、用来(用以)、作为…、供…之用、往、向。
- ② Silver and gold plating are for appearance. 镀金和镀银是为了美观。
  - ② These instruments are called Megohm-meters or Meggers for short. 这些仪器叫做梅格欧姆计, 或简称兆欧计。
  - ② Rods of W-10Re alloy were also obtained for comparison. 也弄到一些 W-10Re 合金棒材, 用来进行比较(或以资比较)。
  - ② This train is bound for Chengdu. 这次列车开往成都。
- 表示原因或理由, 可译为因(为)、由于
- ② Alloy 6205-T5 is singled out by Alcoa for its extraordinary impact properties. 6205-T5 号(铝)合金因其优异冲击性能而为美国铝业公司所选中。
  - ② The insulation was burnt for overheating. 绝缘因为过热而烧毁了。
- 表示所涉及的对象, 可译为对…来说、就…而论。
- ② The technique is of adequate precision and accuracy for use in the power industry. 对于在动力工业中的应用来说(当应用于动力工业时), 这种技术是具有足够的精密度和准确性的。
  - ② The chemical purity of the sponge iron had a positive effect, especially for the production of spheroidal graphite cast iron and high grade hot metal for steel making. 海绵铁的化学纯度产生了有利的影响, 对于球墨铸铁和优质炼钢生铁的生产尤其如此。
- 表示用途, 译为所需要的、…(所)用的
- ② The carbon dioxide is the sole source of carbon for the bacteria. 二氧化碳是细菌所需要的碳的唯一来源。
  - ② It is an instrument for measuring high temperature. 这是测量高温用的仪表
- 表示所经历的一段时间, for 省略不译
- ② The sample was heated to about 1700°C for long enough(at least one hr). 试样加热到 1700°C 左右, 并在此温度下保持足够长的时间(至少一小时)。
  - ② They have worked on this subject for three years. 他们研究这个课题已经有三年了。
- 表示所经历的一段距离, for 省略不译
- ② The ground is level for several miles. 几英里内 地面都是平坦的。
  - ② We have walked for ten kilometers. 我们已走了十公里。
- 表示交换或代替, 可译为换、花、替等。
- ② I want to change the book for your fountain pen. 我想用这本书来换你的钢笔
  - ② Company A bought the plant for 20 million dollars. A 公司花二千万美元购买了这座工厂。
  - ② A is substituted for B. A(可用来)代替 B。
  - ② Will you do something for me? 你愿意替我作点事吗?
- 表示赞成、支持。
- The preceding discussions compare the bases for and against reconstruction theory.  
上述讨论比较了支持和反对再构造学说的依据。
- 表示适于…的、属于…的、给…的。
- ② It is the very place for a range. 这正是适于作靶场的地方
  - ② This is a present for you. 这是[送]给你的礼物。

## 10.from

- 表示时间、空间、变化范围的起点, 可译为从、自、由、(距)离。
- ② The power consumption ranges from about 500 watts for a small electric fire to 3000 watts for a large one. 耗电量的范围是从小电炉的大约 500 瓦到大电炉的 3000 瓦。
  - ② It reduces sulphur content from around 0.024% down to 0.006% at a chemical efficiency of 75%. 它将硫含量从 0.024% 左右降低到 0.006%, 化学效率为 75%。



➤表示起源或依据, 可译为来自、从、利用、根据等。

④ The most significant information from the entire lot of analytical data derived from an attempt, as shown in figure 9, to correlate the potassium content in the sheet materials with the original as-sintered grain size of the materials. 从全部分析数据中获得的最重要的结果, 如图 9 所示, 是来自为确定薄(钨)板材料中钾含量同该材料烧结坯中原始晶粒度的关系所做的工作。

④ Leach rate can be determined from the linear portion of the leach curves. 浸出速率可根据浸出曲线的直线部分加以确定。

➤表示材料, 可译为用(由)…(制成)、…制的。

④ Steel is made from iron, and iron is made from iron ore. 钢由铁制(炼)成, 而铁则由铁矿石制(炼)成。

➤表示分开和隔离, 译为同…分开、与…隔离。

④ Five from eight leaves three. 八减五余三。

④ All combustibles must be kept away from the fire. 一切可燃物都必须与火隔离开。

➤和某些动词连用, 表示免除和阻止, 可译为排除、免于、没有、防止, 但因动词中已包含有这些意思, from 可省略不译。

④ More conventional ceramics requires processing temperatures which eliminate all but a few refractory metals from consideration in such composite system. 较常用的陶瓷工艺所要求的加工温度, 使得不能考虑在这种复合系统中采用除少数难熔金属以外的任何金属。

④ The P/M parts are free from defects. 粉末冶金 制件没有缺陷。

④ Chromium plating can be used to protect steel from rusting. 镀铬能用来防止钢铁生锈。

➤表示原因和动机, 可译为因、出于。

④ Her father died from cholera. 她的父亲因霍乱而死(死于霍乱)。

④ He did it from a sense of duty. 他做那件事是出于责任感。

## 11.In

➤表示地点和位置, 可译为在…(里、中)、位于…。

Tests are carried out in the laboratory. 试验是在实验室里进行的。

➤表示在一段时期内, 可译为在…内。

We can complete the task in five days. 我们能在五天内完成这项任务。

➤表示动作正在进行(与动名词连用), 译为在…时。

A stretched spring can do work in contracting to its normal length.

一根拉长了的弹簧在收缩到它的正常 长度时能够作功。

In drilling certain types of hard rock, this perforator will not do.

在对某些类型的硬岩钻孔时, 这台穿孔机将不适用。

➤表示在某一领域或范围之内, 可译为在…方面、在…中、在…上。

④ Silver is the best conductor of heat and electricity known and is next to gold in malleability and ductility. 银是已知的最好的导电体和导热体, 并且在展性和延性方面(它)仅次于金。

④ Variations in reaction rates were relatively small. 反应速率(方面)的变化是比较小的。

④ There are a host of variables ranging in importance that determine the rate of progress of the reactions taking places. 存在着许多具有不同重要性的、能决定反应进行速率的变数。

④ The transportation of fluids is one of the most important unit operations in chemical engineering. 流体的输送是化学工程中最重要单元操作之一。

➤表示方式、方法或状态, 可译为以(用)…的方式(形式)、以…的形态、在…状态下。

④ Iron finds greater use than any other metal when it is in the form of alloy. 铁以合金形式存在时, 它比其它任何金属的用处都大。



- ☉ The terminals may be connected in star or in delta. 线端可按成星形或三角形。
- ☉ If residual impurities are present in solid solution in amounts greater than 0.005%, they would appreciably reduce both electrical and thermal conductivity of pure copper by 4 percent IACS. 如果残余杂质以固溶体的形态存在,而且其数量大于 0.005%的话,它们就会大大降低纯铜的电导率和热导率,即比国际标准纯铜(IACS)降低 4%。

➤在将来时表示过…以后。

- ☉ We shall leave for Beijing in a week. 我们将在一星期以后去北京。

➤表示工具或材料,可译为用、以。

- ☉ The printed circuit is pressed in some metal. 印刷电路是用某种金属压上的。
- ☉ The key plan is drawn in pencil. 这张平面布置总图是用铅笔画的。

➤表示单位、数量或程度, in 省略不译。

- ☉ The electric resistance is measured in ohms. 电阻的(计量)单位是欧姆。
- ☉ It is true in part. 它部分正确。

➤与个别动词连用,表示进入(=into)。

- ☉ We can make hydrogen and oxygen be combined in water. 我们能使氢和氧化合成水。

## 12. less

➤表示不足、差、减去。

- ☉ Eight less six leaves two. 八减去六余二
- ☉ The time cycle is a month less five days. 时间周期为一月差五天。
- ☉ The remaining gas, less a purge stream to prevent methane and inert gases from accumulating, is recycled to the compressor. 去除了防止甲烷和惰气积聚的吹扫用气流以后,剩余的气体回送到压缩机中。

## 13. of

➤表示所属关系,在 A of B 词组中应倒译为 B 的 A

The life of such device is three years. 这种装置的寿命(使用期限)为三年。

➤表示数量限定关系,在 A of B 词组(当 A 为 many、much、few、little 等不定代词或 a lot、a piece 等量词或 tens、a hundred 等数词时)中,可顺译成 A 的 B(of 大多省略不译)。

Initially only very small percentages of sponge iron were used.

起初(在炼钢炉料中)只使用很小百分比的海绵铁。

In many of its reactions hydrogen peroxide is an oxidizing agent.

在过氧化氢的许多反应中,它都是氧化剂。

➤表示整体中的某一部分,可译为在…中

For example, of the 10 million tons of steam cracker gasoline produced each year, about 2.5 million tons go directly to the motor fuel pool after first-stage treatment. 例如,在每年用蒸汽裂化法生产的 1000 万吨汽油中,大约有 250 万吨是在经过初步处理后就直接送往汽车燃料贮池中去的。

The hydrogen atom is the lightest and simplest of all atoms.

氢原子是所有原子中最轻、最简单的。

➤表示描述关系(所构成的介词短语用作表语或定语,说明性质、种类等特征),of 有时可省略不译,有时可译为具有…、…的。

- ☉ Radar is of great value for aviation. 雷达对航空很有价值。
- ☉ The horizontal component of forces acting in many tunnels must be of the same order of magnitude as the vertical component. 作用于许多隧洞的力的水平分量必然和垂直分量处于同一数量级。
- ☉ This machine is of a new type. 这台机器是新型的
- ☉ The ball mills are of various types and sizes. 这些球磨机具有不同的型号和尺寸。

- 表示来源、起因或动机, 可译为来自、出于
  - ④ Theory comes of practice. 理论来源于实践
  - ④ The explosion cannot have happened of itself. 这爆炸不可能自行发生。
  - ④ He has to do this test of necessity. 他出于需要不得不做这项试验。
- 表示材料、组成等, 可译为…作的、由…。
  - ④ Thermocouples made of semiconductors are capable of producing both heat and cold. 用半导体作成的热电偶能产生热和冷。
  - ④ A compound is made up of two or more elements. 化合物由两种以上元素组成。
  - ④ The electric machine consists of two parts, the stator and the rotor. 电机由定子和转子两部分构成。
- 表示动宾关系或主谓关系(当 of 用在动作性名词后面时)。在 A of B 的词组中, A 和 B 构成动宾关系时可译为 AB (of 省略不译); B 和 A 构成主谓关系时可译为 B(的)A。
  - ④ The production of heat by electric current is of much practical importance. 利用电流产生热是具有很大实际意义的。(动宾关系)
  - ④ The attracting of iron to a magnet is shown in this experiment. 磁铁吸铁已由这项实验证明了。(动宾关系)
  - ④ The rotation of the earth causes day and night. 地球(的)自转产生了昼夜。
- 表示同位关系, 一般应倒译并省略 of。
  - ④ The three factors of voltage, current, and resistance are related to each other. 电压, 电流和电阻这三个因素相互有关。
  - ④ The bulb has a resistance of 150 ohms. 这灯泡具有 150 欧(的)电阻。
- 表示与某人、某物有关, 可译为关于…、对于…、想到…、说到…、在…方面。
  - ④ An exploratory study has been made of the production of an engineering parts by the backward cold extrusion of copper powders. 已进行了(关于)用铜粉末的反向冷挤压法生产工程零件的探索性研究。
  - ④ In the nineteenth century, some scientists already spoke of the possibility of transmitting radio signals over a distance. 在十九世纪, 一些科学家已经谈过(关于)远距离传输无线电信号的可能性。
- 表示距离、剥夺或除去
  - ④ There are many works within five miles of the station. 离车站五英里以内有许多工厂。
  - ④ Three high chimneys in front of the building deprive it of light. 厂房前面三个高大的烟囱挡住了光线。
  - ④ He borrowed three books of me. 他从我这里借去三本书。
  - ④ Crude benzoic acid is then purified of reaction side-products in an atmospheric-pressure rectifier. 粗苯酸然后在大气压(常压)精馏器中, 清除反应副产物。

#### 14. On

- 表示地点, 具有在某物上面并和它接触的含意, 可译为在…上。
- 表示在某一侧或某方位, 有靠近的含意, 可译为在…侧(边)、靠近…等。
  - ④ There is a grinder on the left of the lathe. 在车床左侧有一台磨床。
  - ④ Hankou is on the north of Wuchang. 汉口位于武昌北面。
- 表示特定的时间(日期、早晨、中午、夜间等), 可译为在…、于…。
  - ④ The plant was brought into operation on November 15, 1976. 工厂是在 1976 年 11 月 15 日开工生产的。
- 用于动名词或动作性名词之前, 表示当…时、一…就。
  - ④ Ferrous sulphate crystallizes quite readily on cooling the hot liquors to suitably low temperatures. 当热溶液冷却到适当的低温时, 硫酸亚铁很容易结晶。

- ④ On careful hydrolysis of an ester with barium hydroxide the salt of acetoacetic acid is formed. 当用氢氧化钡小心地使酯水解时, 就形成乙酰乙酸酯。

➤表示作用方向 and 对象, 可译为到…上、对…。

- ④ A black body absorbs all colors falling on its surface. 黑色物体能吸收所有落到它表面上的颜色。
- ④ The weight of a body is the gravitational attraction exerted on the body by the earth. 物体的重量就是地球对它的引力。

➤表示论述对象, 可译为关于…、论…、就…。

- ④ Current works on fabrication of glass fiber composite are as follows. 目前关于制造玻璃纤维复合材料的(研究)工作如下。
- ④ Tests on rock materials have shown that … (关于)岩石材料(的)试验表明…。
- ④ A number of major symposia and conferences have been held on this subject since 1971 and more are in the planning stages. 自 1971 年以来, 已就这一课题召开了许多重要的讨论会和会议, 并且有更多的会在计划中。
- ④ A study has been conducted at the British Steel Corporation on the causes for variations in properties of 9% Ni steel in the longitudinal and transverse directions when evaluated in the temperature range from room temperature to -196°C. 英国钢铁公司已对 9% 镍钢在纵向和横向上性能变化的原因进行了研究, 对性能作鉴定时的温度范围为室温到-196°C。

➤表示依赖、根据或理由, 可译为依靠…、取决于…、根据…、用…、因…。

- ④ They depend on depth to avoid breakthrough. 他们依靠纵深配备来防止突破。
- ④ Location of the scrap yard and control room was predicated on future expansion considerations. 废钢场和控制室的位置根据对将来扩建的考虑来确定。
- ④ Blast furnaces have had to be operated at times on available materials regardless of their physical characteristics. 高炉有时不得不用所可获得的任何原料来操作, 而不管这些原料的物理特性如何。
- ④ The entire sequence will be monitored and recorded continuously on instruments. 整个(操作)顺序将用仪表连续地加以监视和记录。

➤表示状态、经过或变化, 可译为在…。

- ④ The machines are on the operation. 机器在操作
- ④ Who is on duty? 谁在值班?
- ④ The ash from the boiler of a power plant is usually dumped into the sea or on to waste ground. (来自)发电厂锅炉(的)灰通常是倾倒在海里或倾倒在灰渣场上。
- ④ A 250W infra-red lamp shone on to this thermometer for 10 minutes. 用 250 瓦的红外灯对这个温度计照射了 10 分钟。

## 15.Out of

➤表示空间位置, 可译为在…外。

The smelting plant is out of town. 冶炼厂在城外

➤表示动作方向, 可译为从…(当)中、由…里。

When the copper wire is pulled up out of a horse-shoe magnet, the induced current flows in the opposite direction. 当把铜线从马蹄形磁铁(两极之间的缺口)中向上拉出时, 感应电流就朝着相反的方向流动。

Pump as much air as possible out of the container.

尽可能地把容器里的空气都抽走。(从容器里抽走尽可能多的空气)

➤表示来源、材料或动机, 可译为从…、出自…、用…(作材料)、因…。

This new technique is introduced out of Japan. 这项新技术是从日本引进的。

We have made an electric motor out of old parts. 我们已用旧零件制造了一台电动机。

He did this out of necessity. 他出于需要而做了这件事。

➤表示失去、没有、脱离或解除。

The airplane is out of control. 飞机现在失去了控制。

It is out of doubt. 这是确实(无疑)的。

We have got out of many difficulties. 我们已摆脱了许多困难。

➤表示使…不…、使…、放弃(取消)…。

Wood charcoal is made by heating wood out of contact with the air, a process which is called destructive distillation. 木炭是在与空气隔绝(不使与空气接触)的情况下加热木头而制成的, 这种方法称为分解蒸馏。

we argued her out of her wrong plan. 我们说服她放弃她的错误计划。

## 16. Over

➤表示在某物的正上方(垂直在上), 并有覆盖、遮蔽之意, 可译为在…上(方)

The weight of the air over one square foot of the earth at sea level is 2160 pounds. 在海平面标高上每平方英尺地面上的空气的重量为 2160 磅。

Our factory is right over a railway tunnel. 我们的工厂正好在一条铁路隧道的上面。

➤表示遍及、全面、整个。

Increasing demand over the years necessitated …. (在)这些年来(一直)不断增长的需要使得…。

The strength properties were investigated over the temperature range from R.T. to 1600°C.

研究了在室温到 1600°C 的(整个)温度范围内的强度性能。

➤表示在数量或时间上的超过, 译为…以上、超过、多于。

The silicon carbide reactors are exposed to over 1100°C at heat source side. 碳化硅反应器在热源一侧经受 1100°C 以上的高温。

In order to minimize the secondary product formation it is necessary that the butene feed be in stoichiometric excess over the methylal. 为了把次要产物生成量减少到最小限度, 有必要使丁烯的给入量超过对甲缩醛的化学计算量而有余。

The plant has produced over 250000 t of formed coke. 该厂已生产了 25 万吨以上的型焦。

They have lived in Shanghai over three years. 他们已在上海住了三年多。

➤表示空间上的跳越或超出, 可译为越过、通过、溢出。

☉ Soldiers can jump over the brook. 战士们能跳过这条小溪。

☉ They have just come from over the sea. 他们刚从海外(从外国越过海洋)回来。

☉ The gas is dried over the desiccant. 气体通过干燥剂而被干燥。(从干燥剂上流过)

☉ The supernatant liquor flows over the tailing dam. 上清液从尾矿坝上溢出(而流走)。

➤表示动作所涉及的对象, 有关于、控制、支配、监督、保护等含意, 可译为关于、对(于)或省略不译。

☉ We are talking over our production plan. 我们正谈论(着关于)我们的生产计划(的问题)。

☉ They all have growing concern over security and reliability. 他们全都越来越关心安全与可靠(他们全都对安全性和可靠性具有日益增长的关注)。

☉ The complex automatic control system monitors over the whole process by means of computers. 综合自动控制系统能利用计算机监控整个操作过程。

➤表示比较, 可译为和…相比、优于…。

☉ This plant was significantly improved over previous plants.

这套装置比以前的几套有了重大的改进。

☉ Ammonium reacts with nitrogen oxides preferentially over oxygen.

铵同氮氧化物的反应优先于同氧的反应 (或: 铵优先同氮氧化物反应, 而后才同氧反应。)

☉ Thoria is preferred over ZrO<sub>2</sub> as the oxide dispersion.



二氧化钛应比二氧化锆优先用作氧化物弥散剂。

- ☉ It is interesting to note that silver was chosen over copper as the infiltrant materials, even though copper has a higher heat of vaporization per unit of volume. 值得注意的是选择了银而未选择铜作为渗浸材料, 虽然铜的单位体积蒸发热较高。

### 17. through

➤表示通过、穿过、透过、经由、直到。

- ☉ We should pass the oil vapor through a condenser. 我们应让油蒸气通过冷凝器。
- ☉ This is why the metal parts of electrical appliances are joined to a third wire connected through the plug and socket to a water pipe and so to earth. 这就是为什么电器的金属零件要连接到第三根导线 (该导线则经由插头和插座联接到水管上从而接地)上的原因。
- ☉ It can be rotated through 180 degrees. 它能旋转 180。
- ☉ Figures 5 through 8 show...图 5-8 示出了...
- ☉ Fabricability of these tungsten alloys was for the most part excellent through 6 volume per cent ThO<sub>2</sub>. 在这些钨合金中的 ThO<sub>2</sub> 含量直到高达 6 体积%的情况下, 合金的加工性能大多是很好。

➤表示原因, 可译为由于、因。

He failed through carelessness. 他因粗心大意而失败。

### 18. to

➤表示到达空间中的某一点, 可译为到..., 去..., 距...

The power input to the plasma torch was 120kW. (到达)等离子流喷枪的功率输入为 120 千瓦。

➤表示实现或达到某一目标, 可译为达到、到、按照(根据)...(的要求)。

Both the Air Force and the Navy now stipulate that aircraft must be design to fracture toughness and fatigue growth concepts, as well as traditional strength requirements. 空军和海军现时都规定: 飞机必须按照断裂韧性和疲劳发展的理论以及传统的强度要求进行设计。

If the load is increased. the motor slows down and takes just enough extra current to suit the new load. This adjustment of an electric motor to its load is completely automatic. 如果负载增大, 则电动机转速减慢, 并额外耗用恰好足以适应新增负载需要的电流。电动机这种根据(其)负载进行的调节是完全自动的。

➤表示程度、限度、范围或状态变化中达到之点, 可译为到、达。

- ☉ When heated to its critical point, metal will change its microstructure. 当加热到临界点时, 金属就会改变它的显微组织。
- ☉ The average weight of the wire to three significant figures is recorded. 记录了准到小数点后面三位数字的丝料平均重量。
- ☉ Precision balances are made sensitive to a nanogram. 精密天平的灵敏度可达 1 毫微克(准到 1 毫微克)。
- ☉ Eighty to 100 normal cubic meters of oxygen are consumed in the production of one ton of crude steel. 每生产 1 吨原钢要消耗 80~100 标 m<sup>3</sup> 的氧气。

➤表示与谓语动作有关的对象, 引入补足语或间接宾语, 可译为对...(而言)、在...看来、就...、对于...、给...、向...等。

Liquids contract in freezing, water is an important exception to this rule.

液体在凝固时收缩; 对于这条规则, 水是重要的例外。

➤表示比较、对比和比率

The map is drawn to a scale of one to half million.这张地图是按五十万分之一比例尺绘制的。

In all the leach tests performed an attempt was made to maintain a constant ratio of bacterial

inoculums to the initial mineral specific surface area. 在所进行的全部浸出试验中, 都曾力图保持恒定的细菌培育液与初始单位矿物表面积之比。

➤表示到达时间上的某一点,可译为差…(到…)

It is five to ten. 现在十点差五分。

➤表示单位(与 the+单数名词连用)。

5280 feet go to the mile. 5280 英尺为一英里。

The air pressure at sea level is about 15 pounds to the square inch.

海平面上的大气压力约为 15 磅/英寸<sup>2</sup>。

### 19. under

➤表示空间上位于某物的正下方(垂直在下), 可译为在…下(面)。

The plate should be placed under the machine. 这块板应当放到机器的下面。

➤表示在一定数量以下, 可译为在…以下、低于、少于、不到等。

The express train travels forty miles in under an hour. 这列特别快车行驶四十英里用不到一小时。

➤表示隶属关系, 可译为在…之下、属于、根据。

The subject comes under the head of solid physics. 这个题目属于固体物理的范围。

The workers control the machine under the operating instructions.

工人们根据操作规程控制机器。

➤表示所处状态, 可译为在…中、正在…的、在…情况下。

Their plant is under construction. 他们的工厂正在建设中。

The automobile under repair belongs to our university. 正在修理的这辆汽车是(属于)我们大学的。

We must complete the task under difficult conditions. 我们必须在困难的条件下完成这项任务。

Only about half of the coal is recoverable under present mining technology. 用目前的开采技术(在现有开采技术的情况下), 只有大约一半的煤能回采出来。

### 19. until

➤在肯定句中表示谓语动作到一定时刻才停止, 可译为(一直)到……时(为止)。

We work from 7 o'clock in the morning until (till) 5 o'clock in the afternoon.

我们从早晨七点(起)一直工作到下午五点(为止)。

➤在否定句中表示到一定时刻以前不发生谓语动作, 可译为(直)到…以前没有或(直)到…才。

Although it may be possible to remove the carbon contaminant during the preparation of vanadium trichloride, no such effort was attempted because available analytical methods did not detect its presence in the trichloride until late in this investigation. 虽然有可能在制备三氯化钒的过程中清除碳杂质, 但未致力于这方面的试验, 因为直到本研究的后期才利用现有的(现时可用的)分析方法检测出三氯化钒中碳的存在。

### 20. up

➤单独使用时表示向上之意。

A lightning conductor consists of a thick copper strip which is run up the outside of the building.

避雷针由一根厚的铜带构成, 该铜带沿着建筑物的外部向上伸延。

➤和 to 连用, 构成复合介词, 作高达…解。

Laser instruments have been developed for measuring long distances (up to 90 km during night and 50 km by day). 已经研制出测量远距离(白天达 50 公里, 夜间达 90 公里)用的激光仪器。

The instruments can make up to 6000 measurements per second. 这种仪器能在每秒钟内进行六千次测量。

Table 1 gives the results of the most important trials carried out on ICEM formed coke up to



1965. 表 1 给出了到 1965 年为止(1965 年以前)用 ICEM 型焦进行的几次重要试验的结果。

K is up to 9.  $K \leq 9$ 。

## 21. with

➤表示两种事物之间的相互关系,可译为同、和…(一起)。

② These mechanical properties are of the greatest importance to the engineer, and the metallurgical chemist is trying to correlate them with the chemical structure of the various metals and alloys. 这些机械性能对工程人员(来说)具有最大的重要性,而冶金化学家则正在力求确定这些性能同各种金属及合金的化学结构之间的关系。

② 18-2FM steel combines the machinability of type 416 with the corrosion characteristics of type 303. 18-2FM 号钢兼有 416 号钢的切削性能和 303 号钢的耐蚀性。

② There is little loss with the exhaust gas. 随废气而去(和废气一起逸去)的损失很少。

➤表示工具,可译为用。

② The reduction is carried out with reducing gas introduced with the ore. 还原是利用和矿石一起供入的还原性气体进行的。

② When an ebonite fountain pen is rubbed with a silk handkerchief some of the atoms in the silk have one or two of their electrons knocked off. 当用一块绸手帕摩擦一支胶木自来水笔时,丝绸内某些原子的一两个电子就被擦掉了。

➤表示行动的方式,可译为以…、…地。

② Electricity can flow along a copper wire with great ease. 电沿铜线流动很容易。(或:电能够很容易地沿铜线流动。)

② This aeroplane will fly with a speed of 950 Km per hour. 这架飞机将以每小时 950 公里的速率飞行。

➤表示同时发生的情况或所得的结果,用作上文的补充说明;通常在其宾语后面有分词、形容词、介词或副词,后者和宾语构成主谓关系。这时 with 本身无明确意义,不必译出,整个介词短语可译成并列分句,必要时可添加适当的连词。

② Tests were performed in stirred tanks, with volumes between 5 and 50 litres. 试验是在一些搅拌槽内进行,槽的容积介于 5 升和 50 升之间。

② The heat of a chemical reaction is the quantity of heat which is evolved when the reaction takes place at constant temperature and constant pressure, with no work done except that of expansion under this pressure. 化学反应热是在恒温与恒压下发生反应时所放出的热量,(并且)这部分热量除了在此压力下膨胀时所做的功外,不再作任何的功。

➤表示限定的范围,可译为在…(情况)下、对于…(来说)。

② With a given resistance, the current is directly proportional to the electromotive force. 在一定的电阻下,电流与电动势成正比。

② With high priced copper, metal recovery is a real economic factor in choosing a process. 对于价格高的铜来说,金属回收率是选择(炼铜)方法时一项实际的经济因素。

② Best machinability is found with the uniform fibrous grain produced with normal amounts of working. 对于用正常加工量得到的纤维状均匀晶粒,发现其切削性能最好。

➤表示原因,可译为由于。

② In industrial size rotary kilns there have been some problems with wear of the lining. 在工业(规模的)回转窑中一直存在着由于内衬磨损而产生的一些问题。

② With its controllable setting time the material can be used to increase the production of complex shapes by reducing the time between casting and mould stripping. 由于这种材料的凝固时间是可以控制的,使用它就能通过缩短浇注与脱模之间的时间来提高复杂形状制品的产量。

② Some difficulty has been experienced with carbonate deposits in the pumps and pipe work.

已经遇到过由于水泵和管道工程中的碳酸盐沉积物而引起的某种困难。

➤表示两个变量之间的因果关系,可译为随(着)、当…时。

☞ The pressure increases with the rise of the temperature. 压力随温度的升高而增大。

☞ Flatness is in many cases more difficult to achieve with increasing width. 在许多情况下,当宽度增大时,平直度是较难达到的。

➤表示让步,可译为虽然、尽管。

☞ With all his knowledge and experience, he can not tackle this problem.

虽然他的知识和经验都很丰富,他却不能解决这个问题。

☞ With all his faults, I consider him a good comrade.

尽管他有这么多缺点,我仍然认为他是一个好同志。

➤引出间接宾语,可译为向。

☞ We have subscribed 8000 foreign periodicals with Foreign Languages Bookstore. 我们已向外文书店订购了八千种外国期刊。

☞ They want to place an order for machines with a machinery plant. 他们想向一家机器厂预订机器。

➤和某些动词连用,表示离开之意,也可译为和、跟、同。

☞ I parted with them at the station. 我在车站和他们分别了。

☞ They differed with each other on this problem. 在这个问题上他们的意见彼此分歧。

## 21. without

➤作没有解。用法主要有两种:一种是后面跟一个简单的宾语,可译为短语;另一种是后面跟宾语及分词、形容词等(构成主谓关系),可译为句子形式。

☞ Mining engineers and civil engineers cannot excavate mines or build structures without a knowledge of rock mechanics.

采矿工程师和土木工程师不懂得岩石力学就不能开凿矿山和修造建筑物。

☞ This process of passing from solid to vapor and back again without the formation of a liquid is a case of sublimation.

这种不生成液体就从固体变成蒸气并能再变回来的过程,便是升华的一个例子。

☞ An object may be hot without the motion in it being visible.

一个物体,即使其内部的运动是看不见的,也可能是热的。

# 第 8 章 连词的翻译

英语里的疑问代词 (who, whom, whose, which, what)、连接代词(who, whom, whose, which, what, whoever, whatever)、关系代词(who, whom, whose, which, whichever, that, as)、连接副词 (when, where, why, how, whereby, whenever, wherever, however)和关系副词(when, where, why, how) 都可以用来引出从句,起着连词的作用,可以把这些词统称为关联词。

## 第 1 节 连词的一般译法

### 一、介词分类

(1) 简单连词(and, or, but, for 等)

(2) 复合连词(however, whereas, whatever)

(3) 相关连词(both… and, not only… but also, neither… nor)

(4) 短语连词(as if, as soon as, in order that)

(5) 分词连词(provided, supposing, assuming 等);

就语法功能来说,则可分为并列连词和从属连词两大类。

### 二、连词翻译时的注意事项

## 1. 对于并列连词，要弄清并列关系

☉ The Hg is recovered from solutions containing the element in finely divided form, as a colloid, or as a soluble inorganic compound and in an amount 1~100mg/l. 汞可从含汞的(废)溶液中加以回收，在该溶液中汞是作为胶体、或则作为可溶性无机化合物以细分散状态存在，其数量为1~100 毫克/升。

- ☞ 句中的 and 是连接 in finely divided form 和 in an amount 两个介词短语；or 连接 as a colloid 和 as a soluble inorganic compound 两个介词短语，它们又都是补充说明 in finely divided form 的。如果不弄清这些关系，照原文逐字硬译，就可能错译。
- ☞ 对于相关连词，更须对照上下文，找出有关的并列成分，不可孤立地进行翻译。
- ☞ 为了找出相关的并列成分，除了需要从技术内容加以考虑外，主要应从原文句子结构的分析入手。
- ☞ 在一般情况下，并列成分都具有彼此对称的类似结构：要么都是单词，要么都是短语或分句；要么都是名词或代词，要么都是形容词或副词，要么都是介词；要么都是动词，要么都是动名词或分词，要么都是不定式。
- ☉ There are lathes and millers in our shop. 我们车间里有车床和铣床。(and 连接两个名词)
- ☉ We use both gaseous and liquid fuel. 我们既使用气体燃料也使用液体燃料。(both...and 连接两个形容词)
- ☉ She can speak and write French. 她能用法语说和写。(and 连接两个动词)
- ☉ It is impossible to live in society and be independent of society. 生于社会，不能超乎社会。(and 连接两个不定式；be 前面省略了 to)
- ☉ The hair springs lead the current into and out of the coil. 螺旋形弹簧导引电流进入和离开线圈。(and 连接两个介词)

## 2. 对于从属连词，要辨明语法关系

➤ 对于一般从属连词，要了解主句与从句之间的关系(如因果、条件、比较、让步等)。特别是当从句中带有关联词时，须弄清关联词的种类和作用；如系关系代词，更须找出它的前词(先行词)。

The rangemeter has a range of 1m to 10m in its present form and an accuracy of  $\pm 75$  mm or  $\pm 1\%$  whichever is the greater. 在现有形式下，测距仪具有 1~10 米的量程和  $\pm 75$  毫米或  $\pm 1\%$  (以较大者为准)的准确度。

注：whichever 的前词是  $\pm 75\text{mm}$  或  $\pm 1\%$ ，原意是这两个数字中哪一个较大就用哪一个，即当量程为 8~10m 时准确度为  $\pm 1\%$  (即偏差可为  $\pm 80\sim 100\text{mm}$ ，比  $\pm 75\text{mm}$  大)，而当量程为 1~7m 时准确度为  $\pm 75\text{mm}$  (这时其  $\pm 1\%$  为  $\pm 10\sim 70\text{mm}$ ，小于  $\pm 75\text{mm}$ )。假使对 whichever 的用法和意义未搞清楚，就可能译为…无论哪一种都是较大的就错得令人难解其意了。

➤ 对于短语连词，要弄清确实含意。

- ☉ That car does not travel so fast as this car. 那辆汽车没有这辆汽车行驶得那样快。
- ☉ That car does not travel as fast as this car. 那辆汽车和这辆[汽车]的行驶速度不一样。
- ☞ 短语连词中有的含意很明确，如 in order that 只能引出目的状语从句，作为了解。有的则有两种以上的不同含意和用法，如 so that 可作为了解(引出目的状语从句)，也可作以致解(引出结果状语从句)，须根据有关特征或内在含义加以区别。
- ☞ 又如 not as...as 和 not so...as 意义似乎相同，实际上还有一定的差别。not so...as 是 as...as 的否定，表示对两种事物的某种性质进行比较时，前一种事物不如后一种，可译为不如(没有)…那样…；而 not as...as 则强调二者的不同，可译为…和…不一样。

## 第 2 节 并列连词的译法

并列连词是用来表示附加(and, as well as, neither...nor)、选择(or, otherwise, either ...or)、转折(but, while, whereas, nevertheless however, yet,)和因果(so, for, hence, therefore)关系，并引

出并列的词语或分句。它们在翻译方面的共同特点是一律可以顺译，所引出的并列分句都不需要移到前面来。

### 1.and

The void index *i* is also called the index of alteration. However, there are possible causes of alteration of rock material **and** of rock mass other than changes in void **and** pores **and so** the term void index will be the only one used here.

孔隙指数 *i* 也叫做变质指数。但是，除了孔隙和氣孔的变化以外，岩石材料或岩体发生变质还可能有其他的原因；因此，在这里只使用“孔隙指数”这个术语(而变质指数则不予使用)。

►连接句子内的两个对等的并列成分时，一般可译为和、跟、与、并；有时也可改译或省略不译。和可到处使用；跟只能用来连接代词或名词；与可代替和字。在提到两事物之间、两个参数的关系或两个数量之比时，习惯上用与作连词；并字则用来连接动词。至于省略，在连接两个单词或两个短语时都可能，完全以汉语习惯为准(有时也可将 **and** 省略不译，而代以顿号)。

① The strength of the current flowing through the electric circuit between two points depends on its resistance **and** on the voltage between the two points. 经由两点之间的电路流过的电流，其强度取决于该电路的电阻和这两点之间的电压。

② It was later shown that the results of this work were by no means the ultimate and further work has been put in hand to provide closer control and more stable operation in this area. 后来发现，本研究工作的结果绝不是最终定论的：因而已开始进一步的研究工作，以便在这方面提供较为严密的控制和较为稳定的操作。

③ It is believed that steels of these modified types possess the characteristics needed to produce oil and gas from deep wells. 据信这些变型钢种具有从深井中生产油、气所需的性能。

►连接两个不完全对等的名词而且 **and** 前面的词比后面的较重要一些时，可译为及或以及。如果所连接的两个名词意义上有关联而实际上可看作一种事物时，**and** 可译为带、夹或加或省略不译。

④ Analyses of powder and core products are representative of the unconsolidated product and the nonmetallic fraction of the consolidated product, respectively. 粉末产品和心条产品的分析分别代表非致密产品以及致密产品的非金属部分。(非致密产品与致密产品的非金属部分就范围广狭而言是不对等的；但若译为及，又可能使人误会所连接的并列成分是非致密产品的非金属部分和致密产品的非金属部分，因而必须译为以及。)

⑤ rain and snow 雨夹雪； knife and fork 刀叉

►连接两个数词时，如果用 **and** 代表零，则译为零；否则可予省略。此外，也可用 **and** 表示相加。

in the year nineteen and seven 一九零七年； one hundred and live 一百零五

fifty and odd 五十几； six and thirty 三十六

nineteen hundred and eighty-five 一九八五(年)； two hundred and forty-eight 二百四十八

Throe and four arc seven 三加四等于七

►连接两个形容词或副词时，可译为而或又…又…；如果所连接的形容词或副词在译文中都添加词尾的或地字，则 **and** 可省略不译，而加一顿号。

⑥ The blast furnace is an efficient and economical iron-making unit. 高炉是一种有效而经济的炼铁设备。(或…又有效又经济的…、…有效的、经济的…。)

⑦ He worked quickly and carefully. 他工作得快而细心。(或他工作得又快又细心； 他快地、细心地工作。)

►连接两个动词时，如果这些动词具有共同的宾语，则可译为和、或予以省略而代以顿号、或予以省略而重复该宾语。如果这些动词各有不同的宾语，则可译为并或而(且)；如果第一个动词没有宾语，而第二个动词实际上是第一个动词的宾语，**and** 相当于不定式前面的 **to**，则可省



略不译。

- ④ We must analyze and solve the contradiction. 我们必须分析和解决矛盾。(或…分析、解决矛盾、…分析矛盾、解决矛盾。)

- ④ He goes to bed very late and gets up quite early every day. 他每天睡得很晚而起得颇早。

►所连接的两个名词是两种不能并存的事物时, and 可译为或。

- ④ The effect of fiber additions on the properties of fresh and hardened cement and concrete has been extensively discussed. 关于添加纤维对新浇灌(的)或已凝固(的)水泥或混凝土的性能的影响, 已予以广泛的讨论。

注: 水泥和混凝土不能并存, 新浇灌的和已凝固的也不能并存; 因此, 从逻辑学的观点出发, 两个 and 都应改译为或字。从修辞学着眼, 也可将第一个 and 仍译为和字。)

- ④ The application of such an entirely new technology would cut out the remelting cost involved in vacuum and ESR refining processes. 采用这种全新的工艺将可节省真空精炼法或电渣重熔精炼法重熔的费用。

►连接两个分句, 当后一分句表示事态的进一步发展时可译为并且、而且; 当这两个分句表示先后发生的动作或状态时, 可译为然后、于是; 当表示同时或几乎同时发生的动作时可译为又…又…; 当表示因果关系时, 可译为因为、因而、从而、就; 当表示相反的意义时可译为而。如果 and 仅是作为一个过渡词来连接两个对等的分句, 则可以省略不译。

- ④ An alternating current has not a constant direction, and (moreover) it has no constant magnitude. 交流电没有固定的方向, 并且它也没有固定的量值。

- ④ The filtrate contains zinc and (therefore) it is processed for zinc recovery. 滤液含有锌, 因而对它进行处理, 以回收锌。

- ④ The slag is tapped from the cinder notch, and the iron is tapped from the iron notch. 熔渣从出渣口放出而铁水则从出铁口放出。

- ④ Try once more, and you will succeed. 你再试一次, 就会成功。

►连接三个以上对等成分时, 如原文仅使用一个 and(用于最末一个成分之前), 则可予照译或省略; 如使用两个以上的 and, 则可全部照译(当原文是为了强调时), 或则有的照译, 有的改译(当原文有意区别所连接各词的重要性时)。

- ④ The members of the halogen family-chlorine, bromine, iodine and fluorine-are grouped together in one vertical column in the periodic table. 卤族元素-氟、氯、溴、碘-是作为一组列于周期表中同一个竖栏(VIIA 族)内。

- ④ Fluorine itself is a slightly yellow, extremely poisonous and strongly corrosive gas. 氟本身是浅黄色的极毒的和强烈腐蚀性的气体。

- ④ We must develop the electrical power and the steel and the mechanical industries. 我们必须发展电力工业、钢铁工业和机械工业。

## 2. or

►连接句子内的两个对等的成分时, 一般可译为或、或者、或则。

Tungsten surrounded by hydrogen or placed in a vacuum can be heated to a very high temperature. 钨能在氢气或真空中加热到极高的温度。

►所连接的两个成分系同一事物的不同表示法, 即后者为前者的别名、另一种说法或不同计量单位时, 可译为即、(也)就是、等于或(折)合。

- ④ The ability of the crystals to form cubes as they grow with plane faces at right angles to one another and their cubic cleavage, or the ability to be cleaved along cube faces when struck a blow, are both determined by the cubic symmetry of the ionic arrangement. 晶体在长大时形成各晶面互成直角的立方体的能力和它们的立方解理, 也就是遭受打击时沿立方体各平面劈裂的能力, 都决定于离子排列的立体对称性。

- ④ If the reaction between sand and carbon is carried out under certain conditions with a large

excess of carbon, a compound of these two elements is formed which is known as silicon carbide, or carborundum. 如果在砂子与碳之间的反应是在一定条件下进行并具有大量过剩碳的话, 就会生成碳和硅的化合物, 后者叫做碳化硅, 即人造金刚砂。

- ② The demand jumped to 86 tons, or by 34% over the year before. 需要量跃升为 86 吨, 即比上一年增加了 34%。

- ② This distance is four kilometers or 2.4856 miles. 这个距离是 4 公里, 等于(合)2.4856 英里。

➤连接两个接续的数字时 or 可予省略不译。

five or six days 五、六天; 40 or 50 years 四五十年。

➤表示让步意义时, 可译为不论…与…。

Fine or rainy, I go to work everyday. 不论晴与雨, 我每天都去上班。

➤在某些情况下 or 可译为和, 而不译为或。在否定句中 or 的作用相当于 and, 应译为也不、也没有或和。

Are there lathes and millers in your plant? No, there are no lathes or millers in our plant. 你们厂里有车床和铣床吗? 我们厂里没有车床和铣床。

➤连接两个分句而后一个分句表示否定前一个分句时的结果, 这时 or 可译为否则、不然的话(相当于 or else、(or) otherwise, 但语气稍弱一些)

- ② The steel parts of the machine should be covered with grease or (else) they will rust. 机器上的钢制零件应当涂以润滑脂, 否则就会生锈。

### 3. but

➤单独用作连词时, 通常译为但(是)、而; 有时也可省略不译。

➤but 可和别的词一起组成短语连词或相关连词, 常用的有:

➤but yet 作可是如、然而

I agree with you, but yet I cannot do it at present. 我同意你, 可是我现在还不能做这件事。

➤but what 表示后面的句子是否定意思。

Not a man but what knows how to operate that instrument. 没有一个人不懂得怎样操作那台仪器。

➤but that+从句用在句首时, 引出条件状语从句, 作假使…不解。用在主句后面, 而主句为疑问句或否定句时, 表示后面引出的从句是否定意思。

But that he helped me, I should have failed. 假使他不帮助我, 那末我早就失败了。(条件状语从句)

➤not only…but also…可译为不仅…而且…。

For the furnace refractory, not only the heat resistance but the resistance against sodium must be taken into account. 对炉子耐火材料而言, 不仅须要考虑耐热性, 而且要考虑抗钠侵蚀性。

➤no longer…but…可译为不再是…, 而是…。

When an atom of carbon is itself split, the pieces are no longer pieces of carbon but the extremely small particles of which the carbon atom-and, indeed, all atoms-are made. 当对碳原子本身进行分割时, 所分割的碎块不再是碳的碎块, 而是构成碳原子的极小的粒子; 事实上, 各种原子都是由这种极小的粒子组成的。

### 4. so, therefore, hence

➤这三个词都表示推理的结果, 可译为所以、因此。Therefore 比 hence、so 的语气重一些, 译成汉语后则无何差别。它们引出的分句只能顺译。

- ② As production increase at one end of the hot metal line to meet demand at the other, so also does the pressure intensify for reliability and availability in the transport system. 由于增加铁水生产线一端的产量是为了满足另一端的需要, 所以对运输系统的可靠性和可用性的压力也增大了。

- ② There are other factors that will increase the use of scrap, therefore, increase the need for



prereduced iron to supplement the scrap supply. 还有其他一些将会增加废 钢使用量, 因而增加预还原铁需要量以补充废钢供应的因素。

### 5. whereas, while, yet, nevertheless

➤都表示转折, whereas 比 while 正式一些, while 比 yet 用的多一些, 但它们都不如 nevertheless 的语气重(使用 while 多在对比较的场合)。都可译为而、可是、然而。

An atom which loses electrons has a positive valence, whereas an atom which gains electrons has a negative valence. 失掉电子的原子是正价的, 而获得电子的原子是负价的。

She speaks English very fast, nevertheless we understand what she says.

她英文说得很快, 可是我们还能听懂她所说的。

### 6. both...and...

➤用来连接同一个句子内两个完全对等的成分, 可译为…和…(二者)都、既(又)…也(又)…、不但…而且…。

Both copper and aluminum are good conductors of electricity. 铜和铝(二者)都是良好的导电体。

There are both potential and kinetic sources of energy. 既有位能的也有动能的能源。。

### 7. as well as

➤用法类似于 and, 单独使用时也可译为和或并, 与 and 一起使用时, 一般译为以及。如果用在句首, 其前没有所连接的词语, 则可译为除了…以外。

☉ To liquefy air we must cool it to a very low temperature as well as subject it to a high pressure. 为了使空气液化, 我们必须把它冷却到极低的温度, 并使它经受很高的压力。

☉ You and I as well as your brother can do it. 你和我以及你的兄弟都能做(这件事)。

☉ As well as their blue light, mercury-vapor lamps also give out a lot of ultra-violet light. 汞汽灯除了发出蓝色光以外, 也发出许多紫外光。

### 8. either...or...

➤表示或(者)…或(者)…、非(不是)…即…(便是)、要么…要么…, 虽然也是表示选择, 但和 or 单独使用相比, 语气要重得多。在否定句中, 可译为无论…抑或…都、…(也好)…(也好)都…。

☉ The carbon atom can act either as a metal or as a nonmetal. 碳原子既能起金属的作用, 也能起非金属的作用。

☉ Current theories, either empirical or electronic, do not appear to account for this result. 现代的各种理论-经验理论也好, 电子理论也好, 都不能解释这个结果。

## 第 3 节 从属连词的译法

### 1. That

➤用作单纯的连词, 引导名词从句。这时 that 本身无何意义, 也不是从句中的任何成分, 翻译时予以省略。

☉ It may be said that this is not really an answer to the question, for it says where electricity is to be found rather than what it is. 可以说这实际上没有回答这个问题, 因为那只说明什么地方有电而不能说明电是什么。(引出主语从句)

☉ Men have known that smallpox is caused by a virus. 人们已经知道天花是由一种病毒引起的。(引出宾语从句)

➤用作关系代词, 引导定语从句。这时 that 代替其前词, 并在从句中充当一定成分。与 which 不同之处在于 that 所引出的从句都是限制性从句, 而且 that 不能用作介词宾语。这时一般应将定语从句译为前词的前置附加语(…的); 但在定语从句过长时, 为使译文简练起见, 也可将从句译为并列分句, 而将其前词(重复, 加该字或使用代词)译为该分句的主语或宾语。

☉ The first metal that was produced by man was copper. 人类生产的第一种金属是铜。

☉ With the help of the computer, we designed a new control scheme that included an

additional independent variable, T, of anode paste. 借助于计算机, 我们设计了一种新的控制方案, 它(该方案)包括一个新增加的自变量-阳极糊温度 T。

►用作连词, 单独或与别的词配合, 引导状语从句。这时 that 不充当从句中的任何成分, 而可译为适当的连词。

- ④ The inside of this mould is covered with carbon powder that the metal could not stick to the walls of the form. 铸型的内侧要涂上一层碳粉, 以使铁水不粘到型壁上。(that 相当于 so that, 引导目的状语从句。)
- ④ A numerical control machine tool works so fast that the utilization rate is equal to that of five manually operated machine tools. 控机床工作得十分快, 以致它的利用率等于五台手动机床的(利用率)。(引导结果状语从句)

►用作关联词或连词, 在强调句中引导定语从句或同位语从句。这时 that 本身无意义, 可予不译。

- ④ It is only from these deposits that the economical extraction of metal is feasible. 只是从这些矿床中才可能经济地提炼金属。(引出同位语从句修饰 it, 强调 only from these deposits)
- ④ Note that it is an emf that is generated and not a current. 要注意产生出来的是电动势而不是电流。(引出定语从句, 强调 emf。)

## 2. which

►which 既是疑问代词(哪个、哪些), 又是关系代词, 在这两种情况下都可用作关联词。用作疑问代词时是引导名词从句。

- ④ We have not decided which of the tests we should carried out first. 我们尚未决定先做哪一项试验。
- ④ Preliminary investigations dealt with the preparation and reduction of vanadium di-, tri-, and tetrachloride to determine which compound offered the greatest advantage as an intermediate in the preparation of high- purity vanadium. 初步研究是针对钒的二价、三价和四价氯化物的制备与还原的, 借以确定哪一种氯化物作为高纯钒制备过程中的中间产品具有最大的优越性。

►引导限制性定语从句: which 的这一用法与 that 类似(不同之点在于 which 不能代替人), 译法也基本相同。即可译为前置附加语(…的), 或则改译为并列分句而将其前词(重复, 加该字或使用代词)译为该分句的主语或宾语。

- ④ Manganese steel is used for parts which must have high wear resistance. 锰钢用来制造必须具有高耐磨性的零件
- ④ Each of the alkaline earth metals has two electrons in the outer shell which it can readily lose. 每一种碱土金属都有两个能轻易失去的外层电子。(which 的前词是 electrons 而非 shell; it 代替 each, 省略不译。)
- ④ The properties of rock mass vary with the direction and the stratification. So is the modulus of elasticity which is different in directions parallel and perpendicular to the strata. 岩体的特性是随着方向和层理的不同而变化的。弹性模量就是这样: 它在平行于和垂直于层理的方向上是不相同的。(定语从句改译为并列分句, which 改译为代词它。)
- ④ Metallic reduction of the trichloride yielded a ductile metal which contained 820 to 1330 ppm of interstitial impurities including carbon. 三氯化物的金属热还原(方法)产出了延性的金属, 后者(该金属)的间充杂质(包括碳)含量为 820~1330 ppm。
- ♫ 在个别情况下, 根据上下文含义, 有时也可将定语从句改译为状语从句, 而将 which 改译为它的前词并加上适当的连词。
- ④ There are increasing demands during the sixties by the aerospace industries for combined brazing and heat treatment cycles which could be performed economically to give stronger joints with lower reject rates. (二十世纪)六十年代航空航天工业对于把硬钎焊和热处理

这两道工序联合起来进行的要求日益增长,因为这种联合操作法能经济地达到较牢固的结合和较低的废品率。

➤引导非限制性定语从句:限制性定语从句是对其前词施加明确的限制,应译为前置附加语;非限制性定语从句则是对其前词作补充说明,所以通常是作为并列分句译在主句的后面,这时可将 **which** 所代替的前词译为此并列分句的主语(其方法是重复该前词、添加该字或其它指示代词或另外使用代词)。

- ④ Some observations on the fracture behavior of powder metallurgy tungsten, which were made during this investigation and which will throw some additional light on the deformation characteristics are presented. (这里)给出了关于粉末冶金钨的断裂行为的一些观测结果,它们(这些观测结果)是在进行本研究时取得的,并将(使人们)在某种程度上加深对于(钨的)变形特性的了解。
- ④ To improve the intensity of the gas light, a gas mantle was developed, using a mixture of thorium oxide ( $\text{ThO}_2$ ) and 1%, cerium oxide ( $\text{CeO}_2$ ), which had a high luminosity and emitted a reasonably white light. 为了改进煤气灯的发光强度,使用氧化钍( $\text{ThO}_2$ )和 1%氧化铈( $\text{CeO}_2$ )混合物研制出煤气纱罩,后者(该纱罩)具有高的发光度并发射出相当白的光。
- ④ The first stage is the reduction and chlorination of calcined raw materials to form aluminum chloride vapor which is purified. 第一步是还原和氯化已煅烧过的原料,使生成三氯化铝蒸气,并对后者加以净化。(不能译为…使生成净化的三氯化铝蒸气,因为是非限制性定语从句)
- ④ Material fracture takes place in highly localized shear bands, the dimension of which are of the same order of magnitude as the foil thickness. 材料的断裂是发生在 有很大局限性的剪切带,剪切带(后者)的尺寸是和箔材厚度处于同一数量级。
- ④ A. C. can also be changed into D. C. by a device called a rectifier, which let current flow only one way. 交流电也可利用叫做整流器的装置转变成直流电,因为该装置只让电流单向流动。
- ④ This vane is fixed to a spindle, which is fitted with pivots, pointer, and hair spring. 这个叶片固定到主轴上,而主轴装有枢轴、指针和弹簧。
- ④ 一般说来,可以根据 **which** 前面是否有逗号来判断一个定语从句是限制性的或非限制性的:没有逗号时是限制性定语从句,有逗号与主句隔开时则为非限制性定语从句。但这远不是绝对的,更主要的是从原文的内在含义加以判断。
- ④ For all specimens, which failed in a brittle manner, a small plastic strain of less than 0.1 percent just prior to rupture was observed. 对所有(发生了)脆性断裂的试样,观察到刚刚在断裂之前发生低于 0.1%的小量塑性变形。(which 前面有逗号隔开,但仍然是限制性定语从句,不能译为对所有试样而言,是脆性断裂的,观察到…)

➤引导用以说明整个主句的非限制性定语从句:有时 **which** 所引导的定语从句是说明它前面的整个主句,而不是修饰它前面的某个名词(前词)。这时一般可将定语从句改译为并列分句,并将 **which** 译为这,用作该分句的主语。在个别情况下也可改译为状语从句,而将 **which** 译为适当的连词。

- ④ Rubber is a light, elastic, durable and water resistant material, which makes it find wide application in industry. 橡胶是一种又轻、又有弹性、耐用而又不透水,的材料,这使得它在工业中得到广泛的应用。
- ④ Copper has a low ability of combining with oxygen, which is the cause of its resistance to corrosion. 铜的氧化能力弱,因而具有耐蚀性。(或:…,这是它耐蚀的原因。)

➤前面带有介词的定语从句:对于介词+**which** 引导的定语从句,翻译时须考虑该介词的含义。这种定语从句也可分为限制性和非限制性的,一般可根据介词+**which** 之前有无逗号来加以判断。但限制性定语从句太长不便译为前置附加语时,仍可改译为并列分句或状语从句,放在主

句的面；必要时可译为注释文字，加括号放在前词之后。若该定语从句比较简单，则可改译为主从短语。

- ④ Manganese can form a number of compounds in each of which it has a different valence. 锰能生成(其中的锰)各具不同化合价的许多化合物。
- ④ Calcium hydroxide is a very cheap substance but has low solubility and is therefore selected whenever an alkali is needed of which a concentrated solution is unnecessary. 氢氧化钙是一种很便宜的东西，但其溶解度低，因而凡是需用强碱而又不必要使用浓的碱溶液的时候都可选用它(which 的前词为 alkali)。
- ④ Exploratory works for determining the geotechnical parameters of the rock through which the projected Belgrade traffic tunnel will pass included direct measurement of ground pressure. 为确定所计划的贝尔格莱德交通隧道将要通过的岩体的土工参数而进行的勘探工作，包括了地压力的直接测量。
- ④ This is related to control of distribution of burden material in the furnace for which there are several methods, such as changing the stock line level and charging sequence. 这与炉料在(高)炉内的分布的控制有关，而这种控制方法有多种，例如改变料线水平或装料顺序。
- ④ Most gasification processes differ primarily in the type of gasifier and the conditions under which it operates. 大多数气化法的彼此不同之点主要在于气化器的类型及其操作条件。(定语从句 under which...译为主从短语操作条件)

### which 引导的定语从句的译法归纳

(1) 当该定语从句对 which 的前词起限定作用时，应尽可能译为前置附加语。(2) 当定语从句对前词作补充说明时，可译为并列分句，而重复译出前词(包括添加该字和使用代词)，作为后一分句的主语；有时也可添加转折连词而。(3) 当 which 代表前面的整个主句时，一般可将 which 译为这，并将定语从句译为并列分句。(4) 在一定情况下，可将定语从句改译为状语从句，并将 which 译为适当的连词(如：因为等)。(5) 对有介词+which 的定语从句，可译作注释文字，置于前词后面的括号内。(6) 当限制性定语从句较短时，有时可同前词一起简略译为主从短语。

### 3. as

➤ 引导时间状语从句：这时 as 是从属连词，可译为当...时、随着。

This situation will possibly change as ways are round to improve the fiber-matrix bond.  
这种情况在找到改进纤维-基体结合方法时可能会改变。

The pressure varies as the temperature changes. 压力随着温度的改变而变化。

➤ 引导原因状语从句：这时 as 是从属连词，可译为因为、由于。

It seems likely that these germanium rectifiers will replace mercury-arc rectifiers in time, as they waste less power. 很有可能，这些锗整流器迟早将取代汞弧整流器，因为前者耗费的电力较少。

➤ 引导方式状语从句：这时 as 是连词，可译为象...那样、按照。

The oxides of members of P family are an acidic, just as are sulfur dioxide and sulfur trioxide.  
磷族元素的氧化物都是酸性的，正象二氧化硫和三氧化硫那样。

Workers should operate the machines as the instructions specify.  
工人应当按照规程的规定操作机器。

➤ 引导比较状语从句：这时 as 是连词，并利用 as...(形容词或副词) as 及 not so (as)...(形容词或副词)as 句型；可译为和...一样及不象...一样(和...不一样)

This is just as important an experiment as that. 这是和那个实验正好同样重要的一个实验。

The melting point of copper is not as high as that of iron. 铜的熔点不如铁高。

➤引导让步状语从句：这时 as 是连词，所引出的从句常采用倒装语序，可译为虽然、尽管。

② Strong as steel is, it will bend or break under the action of a big stress.

虽然钢的强度很大，在大的应力作用下也会弯曲和断裂。

② Expensive as radium is, it is so active that a few cents' worth will make the watch hands luminous. 镭虽然昂贵，但活性很大，以至于价值几分钱的镭就可使手表指针发光。

➤引导定语从句

(1) 在包含有 such...as 和 the same... as 的句型中，as 是关系代词，引出定语从句。可分别译为象...那样的、和...相同的。

(2) 如果 such 和 as 连用，中间没有名词，则 such 是代词，作这样的人、事、物讲，as 为关系代词，引出修饰 such 的定语从句。

② Such instruments as (are) thermometers and halometers can be found in any physics laboratory. 象温度计和气压计之类(那样)的仪器在任何物理学实验室里都能找到。

② This instrument is not such as I expect. 这不是我所希望的那种仪器。

(3) 如果 such as 前面有复数名词，后面也跟有名词，则 such as 是短语连词，用以引出同位语，对前面的名词起列举的作用，可译为例如或一类。

Reactive metals such as Ti, Zr and Hf were added as hydrides. 钛、锆和钪一类的活性金属是以氢化物的形态加入的。(或：活性金属，例如钛、锆和钪，是以氢化物的形态加入的。)

As many typical units as are needed for the production of the required quantity of sponge iron or as are feasible with the financial resource at the time may be installed. 可以安装为了生产所需数量海绵铁而必须设置的或在当时财力范围内可能设置的那样多的标准设备。

(4) as 用作关系代词时，有时可代替主句里的表语，并且在从句中也起表语的作用。

(5) as 用作关系副词时也可引出定语从句，as 作如同解。

② Alcohol is combustible, as are benzene and gasoline. 酒精是易燃的，苯和汽油也一样。(as 代替 combustible)

② Striker pad wear is shown in Fig.6, as also is shoulder wear which can be very pronounced and is the result of consistent under-filling. (盛铁桶)冲击区垫衬的蚀损示于图 6，图中也示出了肩部蚀损，后者可能是十分显著的，并且是经常未装满的结果。

② A magnetic field may be represented in the same manner as an electric field (is represented). 磁场可用和电场相同的方式表示出来。

➤引导修饰整个主句的非限制性定语从句

(1) 这时 as 引出的定语从句可位于句首或句末，也可以插入句的形式位于句子当中，并都用逗号与主句隔开。as 可译为如(同)、正象...(那样)(大多译在句首)；有时也可省略不译。

② As is now well known, atom is made up of a nucleus and a number of electrons. 众所周知(正如现在人们所熟知的)，原子是由一个原子核和许多电子构成的。

② This furnace, as has mentioned above, has been shut down. 如前所述(前已提及)，这座炉子已经停止操作了。

(2) 上述定语从句中的动词常可省略，只剩下 as+过去分词、as+形容词或 as+介词短语等插入成分(when, after, if 等都有类似的用法)，译法和完整的定语从句的译法相同。

② As mentioned before, the proportion of carbon dioxide increases as the temperature falls. 如前所述，二氧化碳的比例随温度的下降而上升。

② As in the case of phosphorus, silicon remains dissolved in solid iron. 象磷那样，硅在固体铁中处于溶解状态。

② as annealed 退火(状态)的； as cast 铸造(状态)的。

② as forged 锻造(状态)的； as rolled 轧制(状态)的。

➤引出插入句

as 可以引出插入句，用以说明说话人对主句所包含内容的态度或解释，可译为据...、就...。

This old machine, as it appears to me, should be replaced by a new one.

据我看来, 这台旧机器应当换成一台新的了。

4. provided (that), providing (that), supposing (that), in case (that), in the event(that), on condition that 这些连词都表示假设的意思, 引导条件状语从句。

① The magnetic effect does not represent a continuous expenditure of energy, provided (providing that) the current is steady. 磁效应不再继续消耗能量 | 假如电流稳定的话。

② In case (on condition) that the iron ore is a carbonate or sulfide, it must first be heated to obtain the oxide, and then the oxide is reduced with coke. 如果所用的铁矿石是碳酸盐或硫化物, 就必须先对它进行焙烧, 以获得氧化铁, 然后再用焦炭加以还原。

5. in a manner that, in this way that, in such a way that 这些连词意义相近, 都是引导状语从句, 说明主句动作的方式, 译为以……的方式。

① To make them into gems they are ground in such a way that they will reflect light from a number of different faces. 为了把它们作成宝石, 要以能使它们从许多不同的平面反射光线的方式来磨制它们。(或: ..., 要这样地磨制它们, 即使它们将可从许多不同的平面反射光线。

② The second objective was to establish methods to disperse a second phase ThO<sub>2</sub> in W-Re alloys in such a way that strengthening by the classical Orowan mechanism would combine with solid solution strengthening. 第二个目的是研究出把第二相 ThO<sub>2</sub> 弥散在钨铼合金中的方法, 这方法应当能够(使 ThO<sub>2</sub> 的弥散方式)把由于典型的奥罗万机理产生的强化同固溶强化结合起来。

6. to the extent that, to such an extent that 这两个短语连词都有到这种程度, 以致…的含意, 并引导方式状语从句或结果状语从句。to the extent that 还可译为在…的范围内, 在…时, 就…来说; to such an extent that 还可译为甚至。

① It is not possible to allow the tail to wag the dog to the extent that a process is chosen primarily because of its amenability to pollution control, but more and more this factor is being taken into consideration in making the final choice. 不能让次要因素影响主要因素到这样的程度, 以至于选定一种工艺方法主要是因为它适合于污染控制; 但后一因素在作出最后抉择时正受到越来越多的重视。

② Reactions (4) and (5) are endothermic and will only proceed to the extent that heat is supplied by hot-gas transfer from the major oxidizing reactions (8) through (11), which are exothermic. 反应(4)和(5)是吸热的, 并仅在借助热气体的传递从主要的放热氧化反应(8)~(11)供给热量时发生。

③ The few free electrons or charged atoms naturally present in the surrounding air are accelerated by the strong field to such an extent that they are able to knock electrons out of neighboring neutral atoms. 天然存在于周围空气中的少数几个自由电子或带电原子, 被强磁场加速到(这样的程度, 以致)能从邻近的中性原子中击出电子。

7. though, although, notwithstanding (that) 这三个连词都引导让步状语从句, 可译为虽然、尽管…仍。

① Although (Though) the fundamental researches in the modern atomic theory go back in some cases for many years, it is only since about 1910 that much progress has been made and many important results have been obtained still later. 虽然在现代原子理论方面的基础研究在某些情况下可追溯到许多年以前, 但仅是从 1910 年起才有较大的进展, 而许多重要结果的获得则还要晚一些。

② They went to the works, notwithstanding (that) it was raining. 尽管下雨, 他们仍然去工厂了。

8. Whether (or not)

whether 作是否或无论是否解, 能引导各种名词从句和让步状语从句。当它引导的从句是



主句的某一成分(主语、宾语、表语或同位语)时,该从句为名词从句;否则即为让步状语从句。

- ④ It is still a question whether the materials could pass the test or not. 这些材料能否试验合格, 还是一个问题。(主语从句)
- ④ A simple experiment will show whether or not air does have weight. 一个简单的实验就可以证明空气是否确实有重量。(宾语从句)
- ④ He asked me the question whether an electric current could be produced by magnetism. 他问了我关于电流能否由磁力产生的问题。(同位语从句)
- ④ Coke is essential in the winning of iron from its ores by blast furnace and would be prepared for this purpose whether or not the coal tar were collected and utilized. 在高炉炼铁过程中, 焦炭是必不可少的; 因此, 为了要炼铁, 就必须炼焦, 不管是否收集和利用煤焦油。(让步状语从句)。**Whether 与 or 连用时, 可译为不管…抑或…。**
- ④ whether conventional stopper rods or external flow control are used, the demands on the refractories are severe. 不管采用常规塞棒抑或(从外部控制钢流的)滑动水口, 对耐火材料的要求都是严格的。

#### 8. As (so) far as

这个短语连词可引导条件状语从句或比较状语从句, 可译为就……而论、到…的程度(范围)或远至。

- ④ As (so) far as the quality of tones is concerned, this radio is quite up to the standard. 就音质而论, 这架收音机已完全达到标准。(条件状语从句)
- ④ The distance between cities A and B is as (so) far as that between cities C and D. A 市与 B 市间的距离同 C 市与 D 市间的距离相等。(比较状语从句)

## 第 9 章 句子的翻译

### 第 1 节 短语的译法

#### 一、主语

主语的译法比较简单, 但也随用作主语的词语而异。一般说来, 如果主语是单纯的名词、数词或代词(包括它们带有简单定语的情况), 或者是动名词或不定式(不包括由它们构成的短语), 大都可以直接照译在句首。否则, 其译法就须作适当的变通,

►如果主语的定语较多较长, 翻译时通常把部分定语作为外位成分, 与主语分开; 或则把整个主语作为外位成分, 而另立主语。

- ④ As far as refractories performance is concerned, the main advantages of the rotary nozzle system over the straight sliding gate would appear to be…就耐火材料的工作性能而言, 旋转水口系统和直向滑动水口相比, 其主要优点可能是…
- ④ The exact route or mechanism of polymer degradation by ultraviolet radiations is not agreed upon by experts in the field. 关于紫外辐射使聚合物降解的精确的路线或机理, (这方面的)专家们对它是分歧的。

►如果主语是 it, 而且它不是用作人称代词或指示代词, 而是用作非人称代词, 或则用作导引词(作为形式主语或强调句的主语)的话, 往往在译文中略去主语, 成为无主语句或无人称句。如原文为被动语态, 则可改译为主动语态, 并将实际主动者译为主语(原文未给出实际主动者时, 可根据情况添加适当的主语)。

►如果主语是动名词短语(名词+宾语), 则除了个别情况下可译为动宾短语或句子形式(当动名词短语较长较复杂时)外, 一般应译为主从短语, 以免产生歧义。

- ④ Cooling matter causes the molecules to move more slowly. 物体的冷却会引起其分子运动减慢。(译为主从短语物体的冷却比译为动宾短语冷却物体好一些)

- ☉ The recycling of scrap metals for steel production will lead to an increase in the levels of residual or tramp elements, such as tin and copper, in the steels. 把废金属回用于钢铁生产将会导致钢中残存元素(也叫夹杂元素, 例如锡和铜)含量的增加。

➤如果主语为不定式短语, 可根据长短译为动宾短语或无人称句子形式(就象用 it 作形式主语时后面用作逻辑主语的不定式短语通常译为无人称句子形式那样)。

- ☉ To burn fuel is a common way to get heat. 燃烧燃料是一种普通的获得热的方法。(不定式短语译为动宾短语)
- ☉ To bake the film temperatures up to 500°C after deposition is advantageous. 在薄膜淀积后将它烘到 500 °C (的温度)是有好处的。(不定式短语译为无人称句子形式。)

➤被动句中的主语实际是受动者, 在一定情况下可改译为宾语。

- ☉ These units may be put together in any combination to satisfy specific production requirement. 可以把这些部件组装成任何成套设备, 用以适应特定的生产需要。(利用处置式将原主语改译为介词宾语)
- ☉ The quality of products has been improved by us. 我们已提高了产品的质量。(直接将主语还原动词宾语)

➤主语可以照译, 可以省略不译, 可以改译为外位成分、动宾结构或句子形式, 也可改译为宾语, 但这些都是就主语本身译法而言的。

结合主语与谓语动词的内在联系来考虑, 就还须注意所谓主语的假主动问题, 才能确切地理解和表达原文的含义。

在主动语态下, 如果谓语动词是行为动词, 则主语就是该动词所表示的行为的主动者。但对于某些动词 - 表示感觉的动词(look, feel, taste 等)和表示运动的动词(open, end, pass, ring, sound 等)而言, 其主语表面上看来是主动的, 实际意义则是被动的, 这就叫做主语的假主动。

- ☉ (a)The door opens. (b)The door is opened.  
(a)的主语是假主动, 因为门不可能自己打开, 可译为门打开了, 强调门的状态; (b)则用被动语态, 表明门被人打开了, 强调开门的动作。
- ☉ (a)The furnace door will not shut. 这炉门关不上 (主语假主动。实际含义是炉门坏了, 不好关。)(b)The furnace door shall not be shut within ten minutes. 十分钟内不得关炉门。(被动语态。不准人关炉门, 不是不能关上。)
- ☉ Electric shocks feel very unpleasant. 触电令人有极不舒服的感觉。(不能译为“触电感觉极不舒服”, 因为这在逻辑上讲不通。触电这件事的本身不会“感觉” )。

➔有时被动语态不定式可简缩为主动语态(特别是用在 be 后面时), 这也会造成主语的假主动。

- ☉ This machine is to repair (=to be repaired). 这台机器要修理(有待修理)。(不定式作表语用, 相当于主语假主动。)
- ☉ I have nothing to do (=that is to be done). 我无事可做。(不定式 to do 用作宾语补足语, 实际上可以看作是宾语的动词; 而该宾语对它来说相当于主语, 所以这也相当于主语的假主动。)

## 二、宾语的译法

➤照译: 即按原句次序顺译。

- ☉ Conventional metallurgy, based on the blast furnace route, has to rely on hot metal with all its impurities as an intermediate product. 基于高炉路线的常规炼钢法必须依靠作为中间产品并含有多种杂质的铁水。

➤提前: 为了不同的目的, 可将宾语提到动词之前或全句之首。

- ☉ We must carefully process the lean iron ores we use to produce iron and steel before they are fed to the blast furnace. 对于生产钢铁用的贫矿石, 我们必须在加入高炉之前仔细地加以处理。

➤双宾语改译为递系结构: 有的双宾语可和动词一起改译为递系结构(利用使字)。

- ☉ To prevent or, at least, to retard the tendency of metals to oxidize costs the world immense sum of money. 防止或则至少推迟金属氧化的倾向这件事使全世界耗费了大量(巨额)金钱。(the world 间接宾语, immense sum of money 是直接宾语; 递系结构使全世界耗费巨额金钱比直译为耗费全世界以巨额金钱读起来顺口得多。)

### 三、表语的译法

凡是能充当主语或宾语的名词性词语(名词、代词、数词、动名词和不定式)都可充当表语。此外, 形容词性词语(形容词、分词、起形容词作用的副词以及起定语作用的介词短语)也可充当表语。

➤照译为表语, 用以说明主语。其句型为…是…。从逻辑上说, 是字前后应当是相当的、相等的或相同的事物。当表语是名词、代词、数词、形容词或分词时, 大都可采用这种译法。

- ☉ Sulfur is a pale-yellow, brittle solid. 硫黄是一种淡黄色的脆性固体。  
☉ Glass is transparent. 玻璃是透明的。  
☉ Eight minus five is three. 八减五是三(等于三)  
☉ Her logic was compelling when applied to experimental data. 她的逻辑应用于实验数据是令人信服的。

➤改译为动词: 用副词(转换为形容词)作表语时, 往往可改译为动词。

The train is off. 火车开走了。

➤译为动宾短语或无人称句子形式: 用动名词短语或不定式短语作表语时可采取这种译法。

Hardening is bringing material to the condition in which it is best able best to resist indentation, abrasion or scratching. 淬火就是使材料处于不容易产生压痕, 磨损或擦伤的状态。

The moon appears to change its shape. 月亮好象在改变形状。

➤将连系动词改译为具有, 同时将表语改译为宾语: 用 of+宾语作表语时, 可以这样译。

All the atoms of carbon are of the same weight. 所有碳原子都具有相同的重量。

➤将连系动词省略不译: 有时可将介词或介词短语改译为谓语动词, 而将原来的连系动词省略不译。

The distance is beyond three miles. 距离超过三英里。

Sounds having the same frequency are in resonance. 具有相同频率的声音会共振。

### 四、主语补助语

只有在被动句中主语才会有补足语。可以充当主语补足语的词语有名词、形容词、分词、不定式或介词短语。要求有宾语及宾语补足语的动词(call, make, see 等), 用于被动语态时, 其宾语补足语就自然地变为主语补足语。因此在翻译被动句时, 常须结合动词的类型来考虑句中是否有主语补足语。而主语补足语的译法实际上取决于被动句的译法: 如果顺译为被动句或主动句, 则主语补足语也照译; 如果倒译为主动句, 则主语补足语一般改译为宾语补足语。

- ☉ The pole that points North when the magnet is suspended is called the North-seeking pole or more shortly the N pole. 磁铁悬置时指向北方的那一极(被)叫做北极或 N 极。  
☉ The heat required to raise the temperature of one gram of water one degree centigrade is taken as the heat unit and is called calorie. 一克水温度每升高 1°C 所需的热量(被)取为热量单位, 叫做一卡(路里)。(或: 人们把一克水温度每升高 1°C 所需的热量定为热量单位, 称为卡路里。)  
☉ Now, when there is no question as to the reality of atoms and when their mode of combination in molecules and crystals is well understood, the three laws of stoichiometry are seen to be simple consequences of the existence and properties of atoms. 现在, 关于原子的真实性已无问题, 它们在分子和晶体中的结合方式已经很好了解, 因此, 化学计量学的三个定律可(被)看作是原子的存在及其性质的直接结果。

### 五、宾语补助语的译法

➤能要求宾语及宾语补足语的动词中最常用的是 make(使成为), render(使成为), keep(使保持),

cause(使), have(使), get(使), consider(as)(认为,看作), take(as)(把...一作为, 取为), let(让), allow(让), call(叫做)等。可充当宾语补足语的有名词、形容词、分词、不定式和介词短语。根据不同情况, 宾语补足语可译为名词、形容词、动词或动宾短语。

- ④ This makes the economically acceptable amount of iron in the crude tin a feasibility factor. 使得经济上许可的粗锡含铁量成为一项实用性因素。(译为名词)。
- ④ The balance of plant and animal life keeps the amounts of oxygen and carbon dioxide constant 一植物和动物生活的平衡使空气中氧与二氧化碳的含量保持恒定。(译为形容词)
- ④ Through appropriate choice of wave length and sample thickness We can have the hole-electron pairs generated homogeneously. 通过适当选择波长及样品厚度, 我们就能使空穴-电子对均匀地生产出来(就能均匀地产生空穴-电子对)。(译为动词)
- ④ This flow of current in a mercury-vapor rectifier is called an electric arc, and causes the mercury vapor to glow with an intense purple light. 汞弧整流器中电流的这种流动称为电弧, 并使汞蒸汽发生强烈的紫光 (译为动宾短语)。
- ④ You will find this manufacturing process of great value. 你会发现这种制造工艺具有很大的价值。(译为动宾短语)

➤在包含有宾语补足语的句子中, 动词+宾语+宾语补足语往往可译为递系结构(即役使动词后面的宾语是该宾语后面的动词的主语, 后一动词之后有时还可以有宾语或处置式把字结构; 有时也可译为以主谓结构作宾语的动宾结构。

➔除了主语补足语和宾语补足语外, 还有表语补足语, 通常用作表语补足语的是不定式短语或介词短语。

Synthetic fuel oil is easier to store and cheaper to pipeline than SNG. 合成燃料油比合成天然气较易储存, 并且管道输送费用较少。

A solution is homogeneous with respect to subdivision. 溶液细分起来都是均匀的。

## 六、定语的译法

➤译为前置附加语: 即译在所修饰词(中心语)的前面(其后加或不加的字), 组成主从短语。

Electric welding is used to repair iron and steel parts of machinery, and to make steel pipes and frameworks of all kinds. 电焊是用来修理机器的铁制和钢制部件, 以及用来制造, 各种钢管和钢结构。

➔如果由形容词、数词、名词或前置分词充当定语, 则采取顺译法; 如果定语是后置分词或介词短语则一般采取倒译法。但由 of 引起的短语用作数量词的定语时则须采取顺译法。

five liters of water 五升水      a distance of ten miles 十公里的距离

➤译为宾语: 即当所修饰词为动作性名词时可一起译为动宾短语。

the improve of quality 提高质量      raising of a body 举起物体

➤译为状语: 当所修饰词为动作性名词时, 在特殊情况下可将定语改译为状语。

Smokes and fogs are colloidal dispersions of solids and liquids in gases. 烟和雾乃是弥散于气体中的固体和液体的胶态分散体 (或烟和雾是固体和液体在气体中的胶态分散体。)

➤译为句子形式: 用作定语的较长的分词短语或其他复杂的定语结构, 可改译为并列分句或从句。

In chemical reactions there is usually an evolution of heat, derived from the diminution of chemical energy. 在化学反应中, 通常都放出热量, 这起因于化学能的减小。

### ➔在定语的翻译中应注意的问题:

(1) 有时定语与所修饰词是割裂开来的, 须根据句子结构和含义向前找出所修饰词, 能正确地加以翻译。

- ④ Equilibrium studies covering the range of temperatures from 600 to 2000K show concentrations of compounds formed from hydrogen sulfide, carbon dioxide, water and air



of such a magnitude as to affect yields. 涉及 600~2000K 温度范围的平衡研究, 查明了由硫化氢、二氧化碳、水和空气形成的各种化合物的足以影响产率的浓度值。

(2) 定语特别长时, 应尽可能拆散, 或利用标点符号点断, 否则须注意表达清楚各种句子成分之间的关系。

- ④ The results were consistent with a change in the rate controlling step from mass transport to hydrogen atoms in the metal phase to mixed control of a surface chemical reaction and a diffusion controlled process in the melt. 所得结果符合于速率控制方法的如下改变: 从金属相中氢原子质量传递的控制改变到熔体表面化学反应及其内部可控扩散过程的混合控制。
- ④ Another typical catalyst consisting of mixture of boric acid, phosphoric acid and molybdic acid on silica gel prepared in the manner described in a patent did not give any significant amounts of acetic acid. 按照专利中介绍的方法制备的, 由硼酸、磷酸与钼酸混合物和[载体]硅胶组成的另一种典型催化剂, 没有产出任何显著数量的醋酸。
- ④ Table 2 summarizes data derived from detailed calculations of the material and heat balances for desulphurization of the three sulphide concentrates listed in Table 1. 表 2 概括了根据表 1 所列三种硫化物精矿进行脱硫时的物料平衡和热平衡的详细计算(结果)推导出来的数据。

(3) 有两个以上定语同时修饰一个名词(可称为复杂定语结构)时, 可根据该名词的性质(是否带有动作意味)及各个定语的意义, 依一定的顺序加以翻译(不一定按原文顺序), 必要时可适当改译。

- ④ The gas is treated with I or iodide as aqueous solution or on carrier such as activated carbon. 烟气是用水溶液中的或处于活性炭一类载体上的碘或碘化物加以溶解 (两个介词短语照译为前置定语)
- ④ The converter consists of two adiabatic reactors in series, of similar design but of different dimensions, the catalyst bed in the second being deeper than that in the first. 转化器由两台设计相同而尺寸不同的绝热反应器串联组成, 第二反应器中的催化剂层厚于第一反应器中的。
- ④ The effects of hydrogen in aluminum, magnesium and copper alloys are well known. 氢在铝合金、镁合金和铜合金中的作用是众所周知的。
- ④ Studies on the possible use in neutron activation analysis of serum of solvent extraction before irradiation are presented. 提出了关于在血清的中子活化分析中照射前应用溶剂萃取法的可能性的研究结果。
- ④ The technique could also avoid the dilution by carbon dioxide of both the reacting gases and exit gases in the desulphurizing reactor. 此法也能避免脱硫反应器中反应气体和排出烟气被二氧化碳所稀释。

## 七、状语的译法

英语里可以充当状语的有副词、介词短语和不定式。名词也可转换成副词, 用作状语。分词也往往带有状语的意味。

➤ 照译: 即照译为副词性附加语, 用以修饰动词、副词或形容词, 有时也可添加副词词尾地字。

- ④ Basically two techniques can be differentiated for the determination of intermetallic compounds. 测定金属间化合物的技术基本上可分为两种。
- ④ The catalyst beds are fixed in place. 各层催化剂要适当周定。
- ④ Asbestos is formed in situ and can take on just about any shape. 石棉可就地成形, 并且几乎能作成任何形状。
- ④ The aim of the present work is to determine the intermetallic compounds in some aluminum alloys qualitatively and quantitatively and by means of suitable phase technique to establish

ways for rapid identification of these compounds in routine investigations. 本研究的目的在于定性和定量地测定铝合金中的金属间化合物, 和利用适当选择的技术来确定在日常研究工作中快速鉴定这些化合物的方法。

- ④ Calcite has the remarkable property of double refraction, a characteristic which makes it valuable in optical apparatus. 方解石具有双折射这种异常的性质, 这使得它在光学器械中很有用。
- ④ An electric transformer changes, or transforms, the alternating voltage applied to it in proportion to the numbers of turns in its primary and secondary windings. 变压器可与其原绕组及副绕组的匝数成比例地改变(或转换)施加于它的交流电压。
- ④ Circles are drawn on the chart to indicate the 95% and 99% confidence levels as determined from the circular probability table. 曲线图上绘有一些小圆圈, 用以表示根据圆概率表确定的 95% 和 99% 的可信度。
- ④ It is usually present in illuminating gas to the extent of a few per cent. 它(乙烯)通常以百分之几的含量存在于照明煤气中。

➤改译为其他句子成分: 有时根据原文的内在意义, 或则为了行文方便, 也可将状语改译为定语、主语或其他句子成分。

- ④ The data used for the material were reported by Pugh. 所使用的关于材料的数据是 Pugh 报道过的. (for the material 形式上是 used 的状语, 实际是 data 的定语)
- ④ The rotary body can be dipped with its lower end, which contains an axial bore, beneath the bath level into a melt bath container. 旋转体的带有轴向孔的下端能够插入到金属熔池(容器中的熔体)的液面以下。

➤较长的句子有时可译为状语从句。

- ④ But despite their widely different physical properties, diamond, graphite and amorphous carbon are all elementary carbon, and we may prove this experimentally by showing that each of them will burn in oxygen and produce carbon dioxide as the sole product. 但是尽管它们的物理性质大不相同, 金刚石、石墨和无定形碳三者都是元素碳, 并且我们可以用实验的方法来证明这一点; 那就是它们都将在氧气中燃烧并生成唯一的产物二氧化碳。(译为让步状语从句)
- ④ The results are nevertheless beyond dispute, thanks to the accuracy of the physical methods of measuring the characteristics of the electrons and alpha particles shot off from these spontaneously exploding nuclei. 但是, 由于对原子核自行爆裂时所射出的电子及  $\alpha$  质点的特性进行测量时所用的物理方法很精确, 所得的结果是无可争辩的。(译为原因状语从句)

➔一个句子内有两个以上状语时, 要辨明它们是否并列关系, 再根据不同情况适当地加以翻译。

- ④ If the addition of reagent A is not made slowly and with adequate cooling, the reaction may become violent. 如果 A 试剂不是缓慢地并在充分冷却下加入的话, 反应就可能变得激烈起来。(由副词及介词短语构成的两个状语是并列关系)
- ④ The difficulties with the process are associated mainly with speed limitations caused by the fluidization effects, the avoidance of edge cracking, and the fragility of the green strip. 此法的困难主要与速度的限制有关, 这种限制是由于流态化效应、避免边缘开裂和生带材易于脆断而引起的。

➔一个句子内有两个以上状语时, 它们在译文中的先后顺序应符合汉语习惯。

- ④ With a solution of sodium chloride it may be supposed that the sodium first deposited on the cathode by a primary action (i. e. as a direct result of electrolysis) at once reacts with the water by a secondary action (i. e. one not involving electrolysis), forming a solution of sodium hydroxide and liberating hydrogen gas. 对于氯化钠溶液而言, 可以假定: 通过



第一次作用(即电解的直接作用)首先沉积在阴极上的钠,会立即通过第二次作用(即与电解无关的作用)与水起反应,形成氢氧化钠溶液而放出氢气。

→当状语和定语一起使用时,要根据语法关系和技术含义加以鉴别,并适当译出。

☉ Steam generated by the process at 700 psi (50 bars) is used to drive the air compressor. 此过程所产生的(压力为)700 磅/英寸(50 巴)的蒸汽可用来驱动空气压缩机。

☞ 当用作状语的两个介词短语所用的介词相同时,原文有时可省略一个介词,翻译时不可误解。

☉ It is purified by washing with water and then distilling. 它可以通过用水洗涤再予蒸馏的方法加以净化。

## 八、同位语的译法

可以充当同位语的有名词、代词、介词短语、不定式等。同位语独立于句子结构之外,但又与句内某一成分处于相同的地位。同位语通常放在有关成分之后,并具有相同的结构(词性也基本相同)。同位语一般用逗号与句内其它成分隔开,但有时也可不隔开。

➤与有关成分译在一起。

Hydrogen and sodium each have one electron in the outer layer. 氢和钠各有一个电子在外层。

Copper extraction and acid consumption data are correlated with temperature in the range 50 to 150°C and pH in the range 0.25~2. 铜提取率和酸耗量的数据是对应于 50~150°C 的温度范围与 0.25~2 的 pH 值范围的。

➤译在有关成分之后,但用标点符号(逗号或破折号)隔开。

☉ It is useful to be able to start and stop the current in an electric circuit, for instance, to turn a torch bulb on and off. 能够起动和停止某一电路中的电流,例如将手电筒电珠[的电流]接通和断开,是很有用的。

☉ The voltage of a concentration cell depends on the greater tendency of copper ions, e.g. in concentrated solution to deposit on copper, on account of the greater osmotic pressure, than copper ions in dilute solution. 浓差电池的电压依靠铜离子-例如在浓溶液中的铜离子-比在稀溶液中的铜离子具有较大的在铜上沉积的倾向,因为在前一情况下有较大的渗透压力。

➤译在有关成分之后,但用标点符号(逗号或破折号)隔开。

☉ It is useful to be able to start and stop the current in an electric circuit, for instance, to turn a torch bulb on and off. 能够起动和停止某一电路中的电流,例如将手电筒电珠[的电流]接通和断开,是很有用的。

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➤译在有关成分之后,但用括号括住(作为注释文字)。

☉ Any fluctuations in the aluminum and nodular cast iron industries, the principal consumers of magnesium for alloying purposes, have a direct influence on the fortune of the magnesium producers. 铝工业和球墨铸铁工业 (用镁作合金元素的主要用户)的任何波动,都对镁生产工厂的命运有直接的影响。

☉ By using coke, metallurgical or formed, as its energy force, the blast furnace is freed from reliance on electric power. 由于使用焦炭(冶金焦或型焦)作为能源,(炼锌)鼓风机就摆脱了对电力的依赖。

## 九、同位语的译法

插入语是插在句中的独立成分，和句子里各种主要成分没有语法上的连系，去掉它也不影响句子的完整性。插入语可以是一个词、一个短语或一个句子。从功用上说，插入语可以用来补充说明句子内某个词，起定语或状语的作用，或者引出同位语；也可以用来和全句发生关系，起连词的作用，或表示说话者的态度等。插入语可放在句首、句中或句末，一般用逗号隔并，但有时也可不用逗号。

➤与某一个词发生关系时，通常可译在句子中间，与该词在一起。

- ④ Silicon steel, containing 4 per cent of silicon, is much used in electrical machinery where the magnetism changes rapidly, for example, in alternating-current machines. 含硅4%的硅钢大量应用于磁性迅速变化的电机，例如交流电机。
- ④ During recent years there has been an increasing interest in converting metal powders, in particular, copper powder, directly into a finished product in the minimum number of operational steps. 近年来对于以最少工序将金属粉末 - 特别是铜粉末 - 直接加工成成品有着越来越大的兴趣。
- ④ Copper compounds are, in small quantities, essential for the life and health of every plant and animal and, of course, to man himself. 少量的铜化合物对于每一种植物或动物 - 当然也对于人类本身 - 的生存和健康是必不可少的。
- ④ When a rocket moves away from the earth, the earth's gravitational force will, naturally, become less and less. 当一枚火箭离开地球时，地球的引力自然会变得越来越小。

➤与全句有关时，一般可单独译在句首，但有时也可译在句末。

- ④ First of all, a word of warning is necessary about the use of the term oil. 首先，关于“油”这个名词的用法必须特别小心。
- ④ Of course, they did not succeed for the lack of experience. 当然，他们没有成功是由于缺乏经验。
- ④ Electrolysis is accompanied by an absorption of energy. In batteries, chemical reactions occur and chemical energy is transformed into electrical energy, the inverse of electrolysis. 电解伴随着能量的吸收，而在电池组里，发生化学反应，并将化学能转变为电能——这是和电解相反的。

## 第2节 结构的改变

一般说来，词性的转换往往引起句子成分或句子结构的改变：例如动词转换成名词时，可能使谓语变成主语；名词转成形容词(作定语用)时，可能使主语变成定语；副词转成名词时，可能使状语变为主语。

在不少场合，词性的转换并不引起成分或结构的变化：例如用作主语的动名词短语改译为动宾短语(名词转成动词)后仍可用作主语，用作表语的形容词译为动词时在汉语里仍起谓语的作用，等等。因此，词性转换同成分改变、结构更动并不是一回事。成分的改变则必然引起结构的变动。

**1. 主语改译为宾语：**在把被动句改译为主动句时，可将原来的主语改译为宾语。

It is also necessary that the half life and the beta energy be determined for each isotope.  
也必需测定每种同位素的半衰期和贝他能。

Test results of pure W have been included for comparison. 也包括了纯钨的试验结果，以资比较。

**2. 主语改译为谓语：**当主语为动作性名词而谓语为连系动词或被动语态时，可将主语译为谓语，并采用无人称句的格式。

Precautions are necessary to prevent it from burning. 必须注意不要让它烧着。

Attempts were made to develop a new technique for polymerization. 曾试图发展一种新的聚合技术。

### 3. 宾语改译为主语(主语改译为定语)

当动词宾语或介词宾语在意义上同主语有密切的联系(主语的某一属性或者本身就属于主语的一部分)时,为使译文更合乎汉语的习惯,往往可以把宾语译为主语;与此同时,原来的主语也就改译成定语了。如原为介词宾语,则介词可省略不译。

- ④ These reactors had an internal diameter of 140mm. 这些反应器的内径为 140 毫米。
- ④ The electrolysis system has an advantage in that no fossil fuel is used. 电解系统的优点在于不使用矿物燃料。
- ④ The activity coefficient  $\gamma$  changes in value from unity at zero ionic strength (pure water) to a number greater than 1 with increasing ionic strength. 活度系数  $\gamma$  的值随着离子浓度的增大而从零离子浓度(纯水)时的 1 改变为大于 1 的数。

### 4. 宾语改译为定语

当宾语具有定语或将谓语动词改译为动宾结构(即另外增添用作宾语的词)时,原来的宾语可改译为定语。

- ④ This entry thickness of cast aluminum strip allows sufficient cold-rolling to obtain proper metallurgical properties in the heavier deep-drawing stocks. 铸造铝带的这种轧前厚度,使得能够进行充分的冷轧,以制得具有适宜冶金性能的深冲用较厚材料。
- ④ Tungsten carbide can withstand the abrasive action of hot metal during the roiling process far better than cast iron. 碳化钨耐受轧制过程中热金属(轧件)磨蚀作用的能力比铸铁大得多。

### 5. 表语改译为主语

当表语是名词时,它往往可以改译为主语,原来的主语则往往改译为定语或表语。

The rotor is a well-designed structure. 转子的结构设计得很好。

### 6. 表语改译为谓语

由于连系动词+表语起谓语的作用,所以有时可将连系动词省略,而将表语直接译为谓语。

- ④ The porosity of a foil is obviously a function of foil thickness. 箔材的气孔率显然与箔材的厚度有关。(比较:箔材的气孔率显然是箔材厚度的函数。)
- ④ The results are in good agreement with those obtained by titrimetric analysis; the greatest effects are those from Ca and P. 其结果与滴定分析结果很一致;钙和磷的影响最大。(影响最大的是钙和磷)

### 7. 表语改译为定语

在主语+连系动词+表语的句型中,如果主语带有定语,则有时可将表语改译为主语的定语,而将原来的定语改译为表语。

A limited quantity of the reagents was available. 所可利用的药剂数量是有限的。

Their fundamentally different chemical compositions are of great importance. 它们的具有重大意义的化学成分根本不同。

### 8. 谓语改译为主语

由于动词译为名词的词性转换,谓语可以译成主语。

Gold weighs about twenty times as much as water. 金子的重量约为水的二十倍。

### 9. 谓语改译为宾语

某些动词在被动句中用作谓语时可改译为宾语。

The coke bins are shaped as shown so that the bins can be filled without dropping the coke an unnecessary distance and incurring undue breakage. 焦炭贮槽具有如图所示的形状,因而使得把焦炭装入这些贮槽时不致降落不必要的距离而导致过多的破碎。

### 10. 定语改译为主语

当主语为数量词并带有由 of 引出的介词短语作定语时,可将 of 引出的定语改译为主语,而将原来的主语改译为定语或其他成分。

During efficient operation of the biological treatment system, a minimum of 1.5 to 2.0 milligrams/liter of dissolved oxygen is maintained in the aeration tank. 在生物处理系统有效操作期间, 充气槽内的溶解氧(含量)保持在 1.5~2.0 毫克/升的最小值。

### 11. 定语改译为谓语

在用形容词作名词的前置定语时, 一般在汉语里译为主从短语, 但后者有时可转换为主谓结构(因为汉语里形容词可充当谓语); 在此情况下即是将定语改译为谓语。

- ② The highest rate of recovery was at 110°C whereas the lowest rate was at 50°C. 在 110°C 时回收率最高, 而在 50°C 时(回收率)最低。
- ② One feature of operation was the very rapid response of the furnace to changes in blast temperature and humidity. 操作的一个特点是炉子对风温和风湿的变化反应很快。

### 12. 定语改译为表语

如果译文里使用连系动词, 则定语就会变为表语了。

Critical length of eight to nine inches have been measured for a 100:1 reduction of 0.365 diameter EC aluminum wire rod (100,000 psi extrusion pressure) using a low density polyethylene as the viscous media. 对直径 0.365 英寸的导电铝盘条(线材坯), 在压缩率为 100:1(挤压力为 10 万磅/英寸<sup>2</sup>)和利用低密度聚乙烯作粘性介质进行挤压的情况下测得其临界长度为 8~9 英寸。

### 13. 定语改译为状语

Disputations about this problem within the engineering circle has lasted many years. 关于这个问题的争论已在工程界持续了许多年。

### 14. 状语改译为主语

当用介词短语作状语来修饰谓语动词或表语时, 有时可将状语改译为主语。

There can be greater difficulties with changes in the composition of the rolling oil.

改变轧制油的成分可能有较大的困难。

Significant improvement call also be made by shorter hot-stove cycle.

缩短热风炉工作周期也能获致重大的改进。

These materials are highly variable in nature. 这些原料的性质有很大的差异。

### 15. 状语改译为表语

在被动句中、为使译文简练, 有时可将主谓结构(即主语加动词)改译为动宾短语, 用作定语, 同时将状语改译为表语。

The carbon was removed by cyclical heating in oxygen and flashing until there was no reappearance of the square pattern.

脱碳的方法是循环地在氧中加热和闪速加热, 直到不再出现方形(绕射)图象时为止。

Iron is refined into steel for (the purpose of) improving its mechanical properties.

把铁炼成钢(的目的)是为了改善它的机械性能。

### 16. 状语改译为定语

在个别情况下, 状语也可译成定语。

The main objective of thermomechanical treatment is to improve toughness and ductility at a given strength level over that obtainable by more conventional heat treatment.

形变热处理的主要目标是提高用常规热处理所可达到的在一定强度水平下的韧性和延性。

Some typical packages utilized for today's integrated circuits are shown in Fig.5.

目前集成电路的某些典型封装示于图 5。

### 17. 状语改译为补语

All microbes are unvisibly small. 所有微生物都小得看不见。

The number of molecules in any object we call see is unimaginably large.

我们所能看到的任何物体中分子的数目都是大得难以想像的。

The weight of air is negligibly small. 空气的重量小得可以忽略不计。

## 18. 动词改译为动宾结构

在主语+及物动词+宾语(+状语或宾语补足语)句型中,如果要把动词宾语提前,可将原来的动词改为动宾结构,即动宾短语(如在其前添加进行二字);在被动句中,利用原主语改译为主动句时,也往往可以这样。

They have carefully checked the results of statistical analysis.

他们已对统计分析结果进行了仔细的校核。

This extraction rate was confirmed in batch tank tests.

这一提取率在分批槽内试验时得到了证实。

## 19. 主谓结构改译为作定语用的动宾结构

被动句中包含有用作状语的介词短语时,常可将全句改为主动语态判断句,并将原来的主语和动词改为动宾结构,用作定语,将介词意译为名词,用作主语,而将介词的宾语译为表语;或则直接将介词宾语译作主语。

The two products may be separated by fractional distillation.

分离这两种产品的方法可以是分步蒸馏法。

This work was undertaken with the objective of determining the effects of Re additions on the mechanical properties of W-ThO<sub>2</sub> alloys.

进行本研究工作的目的在于确定铼添加剂对 W-ThO<sub>2</sub> 合金机械性能的影响。

## 20. 主从短语改译为主谓结构

原文里由形容词(或其他定语)和名词组成的主从短语常可译为主谓结构。这样译的目的大多是为了使译文读起来更顺口,更符合汉语习惯。

- ④ The sponge iron is of very low density. 海绵铁的密度很低。
- ④ In this way the best voltage can be used for each different purpose, namely easy generation, efficient transmission, and safe home use. 这样就可为每种不同的,即发电容易,输电有效和家庭用电安全而选用各自最好的电压。
- ④ The theory of atomic linkage assumes that isomerism is due to the different ways in which the same atoms are joined together in the molecule. 原子键合理论假定:同分异构现象是由于相同的一些原子在分子中结合到一起的方式不同所致。
- ④ Plasma melting offers these advantages over conventional melting: fast melting rates; vacuum quality heats; stable power, less voltage fluctuations; lower cost furnace installation compared with vacuum induction melting or vacuum arc remelting; remelting with concurrent deoxidation of metal with hydrogen and plasma heat; remelting and simultaneous alloying with nitrogen; plasma refining and remelting with slags; consolidation of fine particle alloy scrap; low cost efficient heat source for flux preparation and hot topping in electroslag remelting and vacuum arc remelting furnace. 和常规熔炼相比,等离子熔炼具有下列优点:熔化速度快;合金质量与真空熔炼的相等;功率稳定,电压波动小;炉子设备费低于真空感应熔炼及真空电弧重熔;在重熔的同时发生氢气和等离子热对金属的脱氧作用;可在重熔的同时加入合金元素氮;可在熔渣(保护)下进行等离子弧精炼和重熔;可将细粒合金废料熔结成锭块;可对电渣重熔炉和真空电弧重熔炉中的熔渣制备和顶部保温提供廉价而有效的热源。

## 21. 主从短语改译为句子形式

- ④ The much lower capacity of direct reduction processes makes them impossible to compete with the blast furnace process. 因为(各种)直接还原法的生产能力低得多,所以它们不能和高炉炼铁法相竞争。
- ④ higher temperature are associated with greater melting rates. 温度升高,熔化速率就加快。
- ④ The rotor has a well-designed structure consisting of a laminated core containing a winding.

转子的结构设计得很好，它由一个迭片铁心构成，铁心上绕着线圈。

## 22. 状语分译为句子形式

用作状语的副词短语或介词短语都常常可以分离出去，另外译成一个分句或从句。

- ④ Based on Bohr atomic theory and wave amplification theory, laser has only recently been developed by scientists. 科学工作者根据波尔原子理论和波放大理论研制成激光器，这只是近年来的事情。
- ④ The terminals of the tube are made in the form of pins at the base of the tube. 真空管脚是制成针状，装在管号底部。

## 第3节 并列复合句的译法

► 英语句子按结构可分为简单句和复合句两大类。

► 复合句分为并列复合句和主从复合句两类。但有时并列复合句中也包含有各种从句，或主从复合句中包也含有并列分句(这两种情况都可称为复杂句)。

► 可以按照一个句子中的两个主要子句之间的关系（并列关系或主从关系）来判断它是并列复合句抑或主从复合句。

► 判断并列复合句中并列分句之句的关系的主要根据是所用连词以及两个分句之间的内在联系；在省略了连词的情况下，也可根据分句之间的标点符号（例如分号）来判定。

## 第4节 主从复合句的译法

### 一、名词从句

#### 1. 主语从句

► 用 it 作为主句的形式主语，而将主语从句(其前加 that)放在主句后面。这种句型常可顺译为无人称句。

- ④ It is likely that from now on increasing use will have to be made of the heavier petroleum fractions which are, at the moment, less urgently in demand. 很可能从现在起将不得不逐步增加目前还不迫切需要的重油馏份的使用量。
- ④ It can be seen that precleaning alone would not reduce the total sulfur content of the four coals to levels anywhere near the standards. 可以看出，这四种煤的总含硫量仅靠预先洗选将不能降低到完全接近标准规定的水平

► 由关联词 what, which, how, why, when, where, who, whatever, whoever, whenever, wherever 及从属连词 that, whether, if 等引导出主语从句，一般照译在句首，并用作整个主从复合句的主语。

- ④ What we now will describe is how the magnetic nature of iron oxide can uniquely be exploited as a separation process utilizing a magnetic filtration system. 现在我们所要介绍的乃是如何奇特地利用氧化铁的磁性而提出一种使用磁力过滤系统的分离法。
- ④ Many technical and economic factors were taken into account, but in the end what really clinched it was the paramount prospect of high versatility in the steelmaking process. 许多技术和经济因素都曾加以考虑，但最后真正起作用的乃是这种炼钢方法的高度通用性的优异前景。
- ④ What Faraday called the electrochemical equivalent is what is now called the chemical equivalent. 法拉第当年称为电化学当量的，就是现在所说的化学当量。
- ④ Which of the three forms a substance will take depends on the kind of substance, and on its volume, temperature, and pressure. 物质取三态中的哪一种取决于物质的种类，以及它的体积、温度和压力。
- ④ Who made these improvements is unknown. 谁做了这些改进，大家都不知道。
- ④ Whether there is also a poisoning effect is not clear, but it is common practice to restore the



contaminated catalyst to its original activity by removal of the iron oxide through a wash in HCl, the so-called pickling process. 是否也有毒化作用还不清楚,但通常的实际操作是通过在盐酸中洗涤-所谓酸洗法-借以去除氧化铁的方法将污染了的催化剂恢复到它原来的活度。

## 2. 宾语从句

引导宾语从句的从属连词及关联词,与引导主语从句者相同。宾语从句充当主句中动词的宾语,一般可照原文顺序译出。

- ① Every one realizes to what extent the world is dependent on petroleum as the source of that magical fluid, gasoline, which has made the automobile possible to drive. 每个人都知道人类生活对石油依赖到什么程度,石油是那种奇妙液体-汽油-的来源,而正是汽油使汽车能够开动。
- ② But, as a matter of fact, we shall see later that this is not the case, that the known quantity of radium is gradually disappearing, and that at the end of about 1600 years it will be half gone. 但事实上,我们在下面将看到,情况并不是那样,一定数量的镭一直是逐渐在消失,过了 1600 年左右它就会失去一半。
- ③ Smelting experiments in this furnace demonstrated that it was possible to carry out complete desulphurization of sulphide concentrates autogenously by reacting the concentrates in their solid state with a steam-oxygen mixture. 这座炉子中的冶炼实验表明,使精矿在固态下同蒸汽-氧气混合物发生反应,以实现硫化矿精矿的自热完全脱硫是可能的。
- ④ Further tests may indicate whether and when by drometallurgical processes could become economically attractive alternatives for copper producers. 更多的试验可能表明湿法炼铜方法是否能够和何时才能变为在经济上对炼铜者有吸引力的替代方案。
- ⑤ One wonders why a hard diamond can be converted to soft graphite or why table salt dissolves in water and diamond do not. 人们感到奇怪的是为什么硬的金刚石会变成软的石墨,或者为什么食盐溶于水,而金刚石不溶于水。

## 3. 表语从句

表语从句是位于主句的连系动词后面、充当主句主语的表语的从句,也是由 that、what、why、how、when、where、whether 等连词和关联词引导的。和宾语从句一样,表语从句采用顺译法,即先译主句,后译从句。

- ① The industrial preparation of glycerol is essentially that has been just outlined. 丙三醇的工业制备法基本上就是刚才所已简略介绍的(那样)。
- ② Energy is what makes things work, and it can be changed into heat or light or used to drive machinery. 能就是使物工作东西,它也能转变为热或光或者用来驱动机械。
- ③ Pure copper wires have very low resistances, which is why they are so much used in electric circuits. 纯铜线具有很低的电阻,这就是为什么在电路中大量使用它们(的原因)。
- ④ It is not possible to change voltage so easily with D.C. supplies, and this is why A.C. has replaced D.C. for most purposes. 直流电源不能很容易地改变电压,这就是为什么在多数用途上已用交流电代替了直流电。
- ⑤ The correct, synchronous, speed is when the rotor revolves once for complete cycle of the A.C. supply. 正确的、即同步的速率,是交流电变化一整周时转子转动一转的那个速率。
- ⑥ We also expect a metal to be ductile, that is, that it can be drawn out into a wire; and malleable, that is that it can be hammered or rolled into thin sheets. 我们也希望金属具有延性,就是说它能拉制成线材;并且我们还希望金属具有展性,就是说它能锤锻或轧制成薄板。

## 4. 介词宾语从句

用作介词宾语的名词从句，其前面的连词或关联词与前述宾语从句所用者相同。介词宾语从句前面的介词可能是和动词、形容词或副词有关的。这种从句一般采用顺译法，必要时可改译为并列分句。

- ④ Manganese is peculiar in that it can form many oxides. 锰的特殊性在于它能形成许多氧化物。
- ④ The kind of engine used depends on what fuel is easily obtained. 所用发动机的种类(选用哪一种发动机)取决于哪一种燃料容易获得。
- ④ The heating produced does not depend on which way the current is flowing, so that A.C. is just as good as D.C. for heating and lighting. 所产生的加热作用与电流向哪个方向流动无关，因此用交流电来加热和照明同直流电一样好。
- ④ The competitiveness of an aluminum foil plant in the international market was, and still is, dependent on how cheaply it can offer a product of optimum quality. 铝箔工厂在国际市场上的竞争能力，过去是现在仍然是取决于它能否以较低的价格提供质量最好的产品。
- ④ As seen there are two groups of thyristors which are fired according to whether the load voltage is to be positive or negative. 可见有两组半导体开关元件，它们分别根据负载电压是正还是负而受到触发。
- ④ Quite independently of which of the three processes is employed, the stock must fulfil the following conditions. (完全)不管采用这三种方法中的哪一种，坯料都必须满足下列条件。
- ④ The electric current from the generators is taken through thick copper wires from the power station to wherever it is needed. 发电机所产生的电流是通过粗铜线从发电厂输送到任何需要它的地方。

## 5. 同位语从句

同位语从句是用来说明它前面的某个名词的、由连词 **that** 引导的从句，相当于定语从句的作用，但在形式上与定语从句不同：定语从句中 **that** 或 **which** 等关联词一方面代替它的前词，一方面又在从句中充当主语或宾语等成分；而同位语从句中的连词 **that** 不是句子成分，也不起代词作用，同时整个从句起着主句中某个名词的同位语作用。同位语从句常用来补充说明 **fact, idea, theory, sense, question, conclusion, news, experience, evidence, proof, condition, law, conjecture, doubt** 等词的具体含义。同位语从句可以根据具体情况译为名词从句、定语从句或外位成分。

- ④ These uses are based on the fact that silicon is a semiconductor of electricity. 这些用途是基于硅是半导体这一事实。
- ④ The operation is adaptive in the sense that the tap-gain-adjustment information is derived from the received data. 抽头-增益-调节的信息是根据所接收的数据推导出的，在此意义上说，工作是自适应的。
- ④ Li Si-Guang arrived at the conclusion that there were good conditions for oil formation and accumulation in the subsidence zone of the Neocathaysian system. 李四光得到了这样的结论：在新震旦系的沉陷区具有生成和聚集石油的良好条件。
- ④ Young mathematician Chen Jing-Run made big advances in research on the conjecture of the German mathematician Goldbach 200 years ago that every even integer... 青年数学家陈景润，在研究二百年以前德国数学家哥德巴赫关于...的猜想方面，获得了很大的进展，从而在数学的这一分支取得了突破。

## 二、定语从句

定语从句一般由关系代词 **that, which, who, as, but** 等和关系副词 **when, where, how, why** 等引导，用来修饰主句中的某个名词。根据具体情况，定语从句可译为前置定语，也可译为并列分句或状语从句。

## 1. 限制性定语从句

这种定语从句是用来限制其前词的范围的，它与主句的关系密切，通常不用逗号同主句隔开。

►直译：限制性定语从句一般应利用的字结构直译为其前词的前置定语。

- ① The polybutylene also has high resistance to corrosive attack by strong acids and bases as is expected for the polyolefine. 聚乙烯也具有聚烯烃可能具有的高的耐强酸强碱腐蚀性。
- ② The job of the control engineer of a power station is to make sure that electric power is generated with as little waste as possible, and he has to deal promptly with anything that goes wrong. 发电厂控制工程师的工作就是保证在发电过程中尽可能不发生浪费现象，并且必须及时地处理所发生的任何故障。
- ③ One of the compelling reasons why the electric furnace is presently attracting much attention as a method for steel-making derives from the fact that the price of electricity is likely to increase at a somewhat slower rate than most other forms of energy. 现时电炉作为一种炼钢方法大为引人注意的重大原因之一，是起源于这一事实，即将来电力价格的上涨速度可能稍慢于大多数其他形式的能源(的上涨速度)。
- ④ X-ray structure analysis can be used with great success particularly in the investigation of two-phase alloys where the crystal type can be determined only crystallographically. x射线结构分析能十分成功地加以利用，特别是在研究那些只能从结晶学上确定其晶体类型的二相合金的时候。
- ⑤ The graphical method of calculating partial molar quantities from molar quantities consists of plotting the value of molar quantity Z against concentration expressed in mole fraction of any one of the components and then drawing a tangent to the curve at the concentration at which the value of partial molar quantity is to be obtained (say at M). 由克分子量计算偏克分子量的图解法，在于绘出克分子量值 Z 与(合金中)任一组元以克分子分数表示的浓度的关系曲线图，而后在将要求得其偏克分子量值的浓度处(比如说 M 点)对该曲线画一条切线。

►改译为并列分句：定语从句较长时，也可用各种方法改译为并列分句。

- ① Like Raoult's law, Henry's law applies within a concentration range whose extent varies from one system to another, but it is valid only at low concentration. 象拉乌尔定律一样，亨利定律适用于一定的浓度范围，后者对每一体系而言是不同的；但亨利定律仅只在低浓度时才有效。(用后者代替前词浓度范围)
- ② The processes of direct reduction can provide a charge for the electric furnace that (which) is estimated today, under favorable conditions, at between 40 and 49 dollar per ton of iron, according to the quality of the ore and other variables. 直接还原法能为电炉提供这样的炉料，其价目前在有利条件下估计为 40~49 美元/吨铁，视矿石质量及其他可变因素而定。
- ③ The only effective control system is one that (which) is capable of informing the operator of the progress of the relining path during the entire course of the blow, so that he can, before the end of blow, take the action necessary to reach the desired end point conditions. 唯一有效的控制系统是这样一种系统，它能把整个吹炼时期内精炼过程的进展情况通知操作工，从而使他能够在吹炼结束前采取必要的措施来达到所要求的停吹条件。(利用这样的…，它(即)…的句型；它字代替前词系统。)
- ④ A multi-purpose machine tool is one that (which) is capable of doing a number of different types of operations. 多用机床是这样一种机床，即能进行很多不同类型操作的机床。

►改变全句结构：即将该定语从句与主句揉合在一起，译为一个句子形式(该从句在其中充当谓语、主语或状语)。

- ① A quantitative analysis of ethyl alcohol shows that it contains carbon. hydrogen and oxygen

in such amounts as correspond to the existence of two carbon atoms, six hydrogen atoms and one oxygen atom. 乙醇的定量分析表明, 它含有的碳、氢和氧的数量的比值符合于这三种元素的原子数目的比值(即 2:6:1)。

- ④ The yeast produces a mixture of enzymes which bring about this fermentation. 酵母产生的酶混合物能引起这种发酵作用。
- ④ The chemical properties of a certain element which depend on the arrangement of these electrons (particular the outer, or valence electrons) are the same whether the element be formed as a result of radioactive change or not. 元素的化学性质取决于电子(尤其是外层电子, 即价电子)的排列方式, 在这一点上各元素是相同的; 不管该元素是否由于放射性蜕变而形成。
- ④ However, there are promising coal liquefaction processes that begin by treating coal with hydrogen-donor solvent. 但是, (有)一些有希望的煤液化法则是在一开始使用氢给体溶剂来处理煤的。
- ④ Effects of processing on surfaces which alter mechanical properties are being studied. 加工对(工件)表面的影响(改变其机械性能)正在加以研究。

## 2. 非限制性定语从句

➤非限制性定语从句一般只能由关联词 **which**, **when** (这时)和 **where**(在这里或在那里)加以引导。用 **which** 时通常以逗号和主句隔开; 用 **when** 或 **where** 时不一定用逗号隔开, 而主要根据含义来辨别。

➤这种定语从句是用来对其前词或对整个主句加以补充说明, 因而都可顺译在主句的后面, 并根据不同情况分别采用三种译法中的一种: 补充说明其前词时译为并列分句; 说明整个主句时(即 **which** 代表其前面的一句话而不是代替某个名词)也译为并列分句, 但用这字或其它总结性词语代替整个主句所表示的概念, 并作为后一分句的主语; 定语从句包含有状语意味时可改译为状语从句(添加适当的从属连词)。

- ④ Fig.9 shows the effect of continuous charging on energy and electrode consumption, which not only eliminates the need for back charging, but also accomplishes refining during the continuous feed period. 图 9 示出了(电炉)连续装料对耗电量和电极消耗的影响, 连续装料不仅不再需要补充装料, 而且也能在连续装料阶段内完成精炼操作。
- ④ The DTA curves for the alumina hydrates show the usual endothermic reactions, which on the dilatometric curves are revealed either as large or small contractions or as distinct expansions. 各种氧化铝水合物的差热分析曲线表示出通常的吸热反应, 后者在胀缩测量曲线上则表现为大小不等的收缩或明显的膨胀。
- ④ At the present the gaseous processes are rapidly developing and are most successful. This is contrary to what was expected three years ago when the solid fuel process of SL/RN seemed the most likely to take off quickly. 目前气体(还原)法正在飞速发展, 并且是很成功的。这与三年前所预料的相反, 当时 SL/RN 固体燃料(还原)法似乎最可能迅速取得成功。
- ④ After melting is completed the steel is transferred to a separate vessel where refining is carried out. 在熔化完毕后将钢水移到另一容器中(在那里)进行精炼。
- ④ Friction wears away metal in the moving parts, which shortens their working life. 运动部件间的摩擦力使金属磨损, 这就缩短了它们的使用寿命。

## 3. 关联词前带介词的定语从句

这类定语从句一般为限制性的, 但有时 (特别是由 **of which** 引导的定语从句)也可以是非限制性的。这类从句可译为前置附加语或并列分句。

- ④ Electronic computers is a subject about which many books have written. 电子计算机是许多书所写的一个课题。
- ④ The neutrons and protons form the nucleus of the atom, around which the electrons move.

中子和质子组成原子核，而电子则围绕原子核旋转。

- ④ All of the principal units of the lathe are mounted on a bed having ways along which the carriage and tailstock travel. 车床的主要部件都装在具有导轨的床身上，刀架与尾架可沿着该导轨滑动。
- ④ The rate at which world continuous casting capacity is continuing to increase is truly phenomenal. 世界连铸设备能力正在继续增长的速度确实是惊人的。
- ④ There is a definite temperature below which a gas must be cooled before it can be liquefied. 气体必须冷却到一定温度以下(, 然后)才能液化。
- ④ The chemical processes by which iron oxides are stripped of their oxygen constituents are complex. 使铁氧化物脱氧的化学过程是复杂的。
- ④ In the determination of atomic weights, for which constancy in composition within one part in 100,000 or more is sought, these methods are often applied many times. 在测定原子量时，因为对于这种测定要求其组成的恒定性达到其偏差小于十万分之一的程度，所以这些方法往往要使用多次。
- ④ Another kind of rectifier consist of a large pear-shaped glass bulb from which all the air has been removed. 另一种整流器由一个大的梨形玻璃泡构成，泡内的空气已全部抽出。
- ④ The alkyl halides are compounds in which the hydroxyl group of the alcohols has been replaced by D halogen atom. 卤代烷类是醇类的羟基为卤族原子取代后(生成)的化合物。
- ④ Heats of formation calculated in this way would refer to elements in states in which the atoms formed single bond as they do in the molecules P<sub>4</sub> and S<sub>8</sub>. 用这种方法计算出来的生成热应当是属于处在这样结构形态下的元素，在该形态下各原子象在 P<sub>4</sub> 及 S<sub>8</sub> 分子中那样形成单键。
- ④ The ability of a surface to radiate energy is governed by the material of which the surface is composed and its physical condition. (物体)表面辐射能量的能力决定于构成该表面的材质以及它的物理状态。
- ④ In making cement, the mixture of limestone and clay in the proper proportion is pulverized to a fine powder and slowly fed into an inclined revolving cylinder through which hot gases are passing. 在制造水泥时，把适当配比的石灰石与粘土的混合物粉碎成细粉，并缓慢地给入到一个有炽热气体从其中通过的斜置旋转圆筒中。
- ④ The base is the foundation of all machines and is the part on which all other parts are mounted. 底座是所有机器的基础，也是一个部件，其它部件都装在它上面。
- ④ A chrome plated surface, such as that with which we are familiar in automobile parts and plumbing fixtures, takes a high polish that is not easily tarnished or scratched. 镀铬的表面，例如我们在汽车部件和卫生设备上所经常看到的(那种表面)，具有很高的光亮度，而不易变色或产生痕迹。
- ④ Some elements are known the atoms of which usually do not combine with more than one atom of any other element. (已知)有这样一些元素，它们的原子通常只能和任何别种元素的一个原子化合。
- ④ As a matter of fact, considerable steel (called mild steel) is now manufactured which, as far as its carbon content is concerned (less than 0.2%), is not different from wrought iron. 事实上目前大量生产的钢(叫做软钢)，就其含碳量(<0.2%)而言，和熟铁并没有什么不同。
- ④ Computations relating elemental physical constants to observed results in a semirandom manner are shown which support this contention. 给出了用半随机方法进行的元素物理常数同观测结果的关系的计算，这些计算证实了这一论点。

### 三、状语从句

状语从句的特征是使用一个从属连词来引导, 并对主句起状语的作用。状语从句可分为时间、地点、原因、条件、方式、目的、结果、让步、比较状语从句。

### 1. 时间状语从句

用来引导时间状语从句的连词有: when, while, before, after, since, until(till), by the time, each time, every time, as, as soon as(as fast as), immediately, instantly, directly, the moment, once, no sooner... than, scarcely (hardly)...when, whenever 等。

按汉语习惯, 时间状语从句要译在其主句的前面, 不管原文是自然语序抑或倒装语序。

- ① For example, when steam passes over red-hot iron, iron oxide and hydrogen form. 例如, 当蒸汽从炽热的铁上通过时, 就会生成氧化铁和氢气。
- ② The selectivity of the electrode increases as the concentration of organic salts decreases. 当有机盐的浓度降低时, 电极的选择性就增大。(或: 电极的选择性随着有机盐浓度的降低而增大。)
- ③ During the third hour of the test some sulphur dioxide odor could be detected in the exit gases as the reaction zone progressed toward the top of the shaft. 在试验的第三个小时内, 随着反应区向竖炉顶部推进, 能发现排出气体中有一些=氧化硫的臭味。
- ④ This concern was alleviated when laboratory tests showed that on heating above 600°C the resistance to abrasion of briquettes was greatly improved, and as briquettes passing down the blast-furnace they should rapidly attain this temperature, they would become much stronger before reaching the melting zone. 这种担心被缓和了, 因为实验室试验表明: 在加热到 600°C 以上的温度时, 型焦的耐磨蚀性大为提高, 而由于向下通过高炉炉身的型焦应能很快达到这一温度, 所以在到达熔化带之前, 型焦的强度将大为增加。

### 2. 地点状语从句

引导地点状语从句的连词有 where, wherever 等, 一般采用顺译法, 即在原文中位于主句之前时, 译在主句之前; 反之, 译在主句之后。但有时亦可将主句后面的地点状语从句译在主句之前。

- ① During the third hour of the test some sulphur dioxide odor could be detected in the exit gases as the reaction zone progressed toward the top of the shaft. 在试验的第三个小时内, 随着反应区向竖炉顶部推进, 能发现排出气体中有一些二氧化硫的臭味。
- ② We use insulators to prevent electrical charges from going where they are not wanted. 我们使用绝缘子是为了防止电荷跑到不需要的地方去。
- ③ As noted previously, where high reactivity of the charge makes close temperature control mandatory, the catalyst in the first reactor can be divided into two beds, with an intermediate liquid quench. 前已指出, 在装料有很高反应能力而必须严格控制温度的场合, 第一反应器中的催化剂可分为两层, 并在中间采用液体冷却。
- ④ Variations and permutations of these procedures are employed, particularly where equipment on hand has been modified for mask manufacture. 这些程序可加以改变或重新排列, 对于现有的为了制造掩模已加以修改的设备尤其是这样。

### 3. 原因状语从句

引导原因状语从句的连词有 because, since, as, that, now that, for the reason that, inasmuch as 等。按照汉语习惯, 原因状语从句一般应译在主句之前。但有时考虑和上下文的呼应, 在原文的原因从句处在主句之后时, 也可采用顺译法, 将该从句保留在后面。

- ① Some sulphur dioxide is liberated when coal, heavy oil and gas burn, because they all contain sulphur compounds. 因为煤, 重油和煤气都含有硫化物, 所以在它们燃烧时会放出一些二氧化硫。
- ② Since this is a continuous coking process, it is necessary to regulate the rate at which



completely carbonized coke is removed from the bottom of the shaft furnace. 由于这是连续炼焦法, 所以必须调节从竖炉底部排出那些已完全碳化的焦炭的速度。

- ④ Inasmuch as the ingots are at a red heat when charged into the pits, it takes only one or two hours to bring them to the proper temperature for rolling. 由于钢锭装入均热炉时是赤热的, 所以将钢锭加热到适于轧制的温度只需一两个小时。
- ⑤ The material first used was copper for the reason that it was easily obtained in its pure state. 最先使用的材料是铜, 因为铜易于以纯的状态制得。

#### 4. 条件状语从句

➤ 引导条件状语从句的连词有 if, only if, unless, as(so) long as, provided (that), providing (that), supposing(that), in case (that), in the event (that), on condition that, except that, assume that, only that, granted that 等。条件状语从句(不论在真实条件句或虚拟条件句中)按汉语习惯一般应译在主句之前; 但有时也可译在主句之后, 即在原文中条件从句位于主句之后时采用顺译法。

➤ 条件状语从句本身的翻译方法有三种: 一是照译出表示条件的连词(如果、假使等); 二是省略上述连词(利用汉语本身的逻辑关系来表示条件关系); 三是改译为时间状语从句。

- ④ If too much current flowed through an ammeter it would cause the voltage to fall when it was connected, and the measured voltage would be wrong. 假如流过安培计的电流太多, 则当连接该安培计时就会使电压下降, 因而所测得的电压值便是错误的。
- ⑤ Conversion of dehydration facilities from glycol to Selexol will be considered if glycol contamination becomes a problem. 如果乙二醇污染成为问题的话, 将考虑把脱水设备从使用乙二醇改为使用溶剂油。
- ⑥ The volume of a given weight of gas varies directly as the absolute temperature, provided that the pressure does not change. 压力不变, 一定重量的气体的体积就与绝对温度成正比。

➤ 在虚拟语气中, 将 if 省略, 并把助动词 should, were, had, could 等提到主语前面, 构成倒装句时, 仍然是条件状语从句, 其译法与带有连词 if 的从句相同。

- ④ Should something go wrong, the control rod would drop. 万一发生什么事故, 控制杆就会落下来。
- ⑤ Were there no electric pressure in a semiconductor, the electron flow would not take place in it. 如果半导体中没有电压, 其内部不会产生电子流动(电流)。

#### 5. 方式状语从句

➤ 引导方式状语从句的连词有 as, like, as if, as though, in a manner that, in this way that, in such a way that, to the extent that, to such an extent that, just as, according as, in degree as, in proportion as, in (much) the same way as 等。方式状语从句一般可按原文顺序照译为方式状语从句或缩译为方式状语, 有时亦可改译为并列分句或定语从句。

- ④ Electric current flows through a wire like tap water does through a pipe. 电流通过导线流动就象自来水管子内流动一样。
- ⑤ The friction between two bodies is generally defined as the force acts between them at their surface of contact so as to resist their sliding on one another. 两个物体之间的摩擦力通常定义为: 一种力在它们之间的接触面上发生作用, 而阻止它们相互滑动。
- ⑥ It is not easy to produce a picture of the forces around electric charges, but lines of force join positive and negative charges in much the same way as they join N and S magnetic poles. 要绘出电荷周围的力线的图形是不容易的, 但力线能以很类似于它们连接南北两磁极的方式来连接正电荷与负电荷。
- ⑦ Each of two wires carrying current has a magnetic field, as if it were a magnet. 通电的两根导线每一根都有一个磁场, 好象是一块磁铁。

#### 6. 目的状语从句

➤引导目的状语从句的连词有 that, so that, in order that, lest, for fear(that), for (with) the purpose that, in the hope that, to the end that 等。按汉语习惯,目的状语从句放在主句之前(为了…)或之后(以使…、以便…、以期…)都可以,所以一般应按原文语序顺译。但有时为了强调该从句中所说的目的,在原文中目的从句位于主句之后时,也可采用倒译法,将从句译在主句之前。

- ④ We must keep ourselves healthy that we may study and work well. 我们必须保持身体健康,才能(以便有可能)学习得好,工作得好。
- ④ The negative work should be maintained at as low a value as possible, for a given pressure ratio, so that a maximum amount of useful work may be obtained. 在给定的压力下,负功应当维持在尽可能低的数值上,以便可以获得大量的有用功。
- ④ Iron products are often coated lest they should rust. 铁制品常常涂以保护层,以免生锈。
- ④ It is necessary first to convert the chemical energy into heat by combustion for the purpose that useful work from the chemical energy stored in fuels might be produced. 为了可以从贮存于燃料中的化学能里产生有用功(的目的),首先需要通过燃烧把化学能转变为热。

## 7. 结果状语从句

引导结果状语从句(包括程度状语从句)的连词有 so that, so…that, such that, such…that, to the extent that, to such an extent that, inasmuch as, inasmuch as 等。结果状语从句在英语和汉语里都是放在主句之后,所以完全可以采用顺译法。

- ④ The blister copper is porous and brittle so that it requires further refining before use. 粗铜是多孔的和脆性的,因而在使用前还需要再加以精炼。
- ④ To reduce the waste of power, the iron core of a transformer is made of a large number of separate thin strips of iron coated with an insulating varnish, so that the eddy current cannot flow from one strip to another. 为了减少电力的浪费,变压器的铁心是由许多涂有绝缘漆的单层薄铁片制成,因此涡流不能从这一铁片流向另一铁片。
- ④ The temperature of the explosion in the cylinders is so high that the metal of the cylinder walls cannot stand it. 气缸中的爆燃温度是如此地高,以致气缸壁的金属经受不住。
- ④ A floating body sinks to a depth such that it displaces its own weight of liquid. 浮体浸入液体刚好到排开与其本身重量相等的液体这样的深度。
- ④ The induced emf is in such a direction that it opposes the change of current. 感应电动势的方向是阻止电流发生变化的那个方向。

## 8. 让步状语从句

➤引导让步状语从句的连词有 though, although, notwithstanding (that), while, even if, even though, even when, whether(…or not), as, no matter how (however), no matter when(whenever), no matter where (wherever), no matter what (whatever), no matter which (whichever), no matter who (whoever), no matter whether, no matter why 等。让步状语从句通常应译在主句之前,只有在个别情况下,为了照应上文,才可以将它译在主句之后。

- ④ Although both gasification and liquefaction have the advantage over direct burning of coal in that ash and most of the sulphur are removed from the coal, liquefaction may have advantages over gasification, such as…虽然和煤的直接燃烧相比,(煤的)气化和液化都具有可去除煤中灰分及大部硫分的优点,但和气化相比,液化又可能具有如下的优点…
- ④ The lathe can turn holes even if it is not a drill. 车床尽管不是钻床也能钻孔。
- ④ However carefully boiler casings and steam pipes are sealed, some heat escapes and is lost. 锅炉壳体和蒸汽管无论怎样仔细地密封,总有一些热要漏出来损失掉。
- ④ All substances, whether they are gaseous, liquid or solid, are made of atoms. 所有的物质,不管它们是气态的、液态的还是固态的,都由原子组成。

➤引导比较状语从句的连词有 than, as…as, not so (as)…as, the…the…等。这类状语从句一般采用顺译法,并且常译为省略句。但有时也可将比较对象分译出来。此外,than 有时可不译为比,

而改译为不或非。

- ④ Thinner fuse wire is used for the lights than for the power points. 较细的熔丝用于照明而不用用于动力。
- ④ Sandstones and limestones are actually much more seen than granites, or lavas. 砂石和石灰石实际上比花岗岩或熔岩要常见得多。
- ④ The thicker is the wire, the smaller is the resistance. 导线越粗, 电阻越小。

### 9.特殊状语从句

在主句中用作表语的形容词所要求的由 that 引导的从句。要求这种状语从句的形容词都是表示感觉的形容词, 如 sure, certain, assured, glad, afraid, happy, hopeful 等。这类状语从句可译为宾语从句或原因状语从句。

- ④ They are sure that any physical change does not change the nature of a substance.  
他们相信, 任何物理变化都不会改变物质的性质。
- ④ The company was hopeful that the start-up period would go without incident.  
该公司当时希望开工阶段将会顺利通过, 而不发生任何事故。

## 第5节 否定句的译法

### 1.全部否定

利用否定词 not, no, never, none, neither, nor, nothing, nobody, nowhere 等, 可造成具有全部否定意义的句子, 不管这些词在句中用作状语、定语、主语抑或宾语, 也不管它们是和动词、非限定动词抑或名词发生关系。这类句子可以直接译成否定句。

Rubber does not conduct electricity. 橡胶不导电。

None of the answers are right. 所有的答案都不对。

Nobody knew the composition of this substance before now. 以前没有人知道这种物质的组成。

### 2.部分否定

英语中 some, all, both, every, many, much, always, often 等词与 not 搭配使用时, 表示部分否定。

➤not some 有的没有。 He has not some of these books. 这些书中有几本他没有。

➤not all 不全是, 只一些

All these metals are not good conductors. (=Not all these metals are good conductors.)

这些金属并不都是 良导体。

All the answers are not right. (=The answers are not all right.) 答案不全对。

➤not both 两个不都(是), 一个(是)

Both the books are not helpful. (=Not both the books are helpful) 这两本书不都是有益的。

Both of the instruments are not precise. 这两台仪器并不都是精密的。

➤not every (=some) 不是每个, 只一些

④ Every machine here is not imported from abroad. 这里的机器并非每台(台台)都是从国外进口的。(错译: 这里的每台机器都不是从国外进口的。)

④ Everyone cannot do a good few tests. (=Not everyone can do a good few tests.)

并非人人都能做不少个试验。(错译: 每个人都不能做不少个试验。)

➤not many (=a few) 不多, 少数几个

Not many of the things are of use in form in which they are found.

不是许多东西在它们处于被发现的形态时就是有用的。

➤not much (=a little) 不多, 少量

Not much of the waste oil is utilized. 废油被利用的不多。

➤not always (=sometimes) 不总是, 有时

But friction is not always useless, in certain cases it becomes a helpful necessity.

可是摩擦并不总是无用的,在某些情况下它是有益的、必需的。

➤ Not often (=sometimes) 不常, 有时

They did not often come here. 他们不常来此。

### 3. 意义否定

英语里有些句子包含有带否定意义的词或词组,因而虽然在形式上是肯定句,实际上却是否定句。

- ② Pure metals have few useful properties. 纯金属没有多少有用的性能。
- ② These experiments show that temperatures above 110°C and below 70°C give unsatisfactory recovery rates at pH 2 to 1. 这些实验表明,在 1~2 的 pH 值下,高于 110°C 和低于 70°C 的温度不能获得满意的回收率。
- ② The book is too difficult for me to read. 本书太难,我读不了。

### 4. 双重否定

双重否定是由否定词 not, no, never, neither, nobody, nothing 等与带有否定意义的词或词组相配合而构成的。双重否定即否定的否定,实质是肯定,而且语气较为强烈。翻译时可以照译为双重否定,也可改译为肯定句。

- ② There is no rule that has no exceptions. 没有无例外的规则。(或:任何规则都有例外。)
- ② Bearings should not be unboxed or unwrapped until the moment for fitting has arrived. 不到安装的时候不应打开轴承的包装箱或包装纸。

## 第 6 节 强调句的译法

英语的句子可利用不同的语法手段来强调其中的某个成分,从而构成了强调句。强调的方法:

➤ 在肯定句的谓语动词之前添加助动词 do (does, did) 来强调该动词(这时它要用动词原形)。

➤ 利用 It is (was) ... that (which, who) ... 的句型来强调句中的某一成分。

➤ 利用倒装语序,以倒装结构来表示强调。

加 do 来强调动词时,可将其译为确实、一定、必须等词,以加强语气。

- ② These bacteria are too small to be seen, but they do exist. 这些细菌小得看不见,但它们确实存在。
- ② This reaction did take place. 当时这个反应确实发生了。
- ② The amount of water vapor that the air does hold, expressed in grams per cubic meter, is called the absolute humidity. 以克/米<sup>3</sup>表示的、确为空气所含有的水蒸气量,叫做绝对湿度。
- ② It is the power subsystem of the communication facility that must provide a constant flow of current under controlled conditions of voltage and load. 正是通信设施的电源分系统须在电压与负载受控制的条件下供给恒定的电流(强调主语)。
- ② It is a constant flow of current that the power subsystem of the communication facility must provide under controlled conditions of voltage and load. 正是恒定的电流乃是通信设施的电源分系统须在电压与负载受控制的条件下予以供给的。(或:通信设施...予以供给的正是恒定的电流。)(强调宾语)
- ② It is under controlled conditions of voltage and load that the power subsystem of the communication facility must provide a constant flow of current. 正是在电压与负载受控制的条件下通信设施的电源分系统须供给恒定的电流。(强调状语)
- ② It is to accomplish this operation with the minimum expenditure of energy that is the principal concern of the urea process designer. (需要)以最低的能耗来完成这一操作,正是尿素工艺设计者所主要关心的问题。(强调主语;采用顺译法完全表达了原文的强调意

味。如果译为：尿素设计者所主要关心的问题是最低的能耗来完成这一操作,虽然并不错,但却未表现强调之处。)

- ④ It was the machining by numbers which we should master. 当时,利用数字的机械加工技术,正是我们所应当掌握的。(强调宾语;也可译为:我们当时所应当掌握的正是数字加工技术。)
- ④ It was not until 1735 that coke could be used to replace charcoal for smelting iron. 直到1735年,才用焦炭代替木炭来炼铁。(强调状语)
- 📖 象 there be...结构虽然也是倒装语序,却不一定译成强调句。需要译为强调句的,主要是将状语移到句首的那些句子。
- 📖 某些地点副词(there, here)、时间副词(often, then, next, hence)、程度副词(only, so)、语气副词(never, nor, seldom, little)等置于句首时,便构成了强调句。翻译这类强调句时,一般采用顺译法即可表达强调意味,有时利用语气词,就、也等字来表示强调。
- ④ There exist many sources of energy both potential and kinetic. 存在着许多位能和动能的能源。
- ④ Hence comes the name magnet. 由此得出磁铁这个名称。
- ④ So fast does light travel that it is difficult for us to imagine its speed. 光运行得如此之快,(以至于)我们很难想象它的速度。
- ④ The melting point of copper is not so high as (is) that of iron. 铜的熔点没有铁的熔点高。
- ④ The smaller the particles, the more freely do they move. 粒子越小,运动得越自由。

## 第7节 长句子的翻译

### 1. 结构分析

在进行翻译时,首先要透彻地理解原文,这就要求分析句子结构,弄清语法关系。即是从结构上判明句子的类型,找出主要的句子成分(主语、谓语、宾语、表语等),并根据语法特征和技术内容分清各个成分(包括子句和短语)的并列关系和从属关系。

#### → 句子结构分析步骤

(1) 通读全句,根据主语和谓语动词数目及有无连词(包括关联词)和连词类别,确定句子的种类(简单句,并列复合句,主从复合句或包含多个分句与从句的复杂句)。

(2) 找出每个句子形式的主要成分(主要的是主语和谓语),并进一步判明句中各次要成分(定语、状语、补足语、同位语、插入语)同主要成分之间的关系。

(3) 在非简单句的情况下,判明各子句之间的并列关系和从属关系,同时最后判明各子句内部的所有成分的并列关系与从属关系(例如是否并列了两个以上的主语、谓语动词、宾语或表语,是否有双宾语或宾语补足语,是否有并列的定语或状语,是否在定语或状语之中又包含有其他成分,它们彼此之间是什么关系,等等)。还须判明每个子句的时态、语气和语态以及是否强调句或省略句。

- ④ Oxygen is also injected upwards into the molten bath through the refractory walls providing close control of thermal and chemical conditions, superior process flexibility, high reaction rates and minimization of refractory, dust, and other problems encountered with conventional tuyeres or top-blowing methods. (在用插入熔池中的特制喷嘴底吹氧气炼钢时)氧气也是穿过耐火炉壁向上喷吹到熔池中,从而达到热状态与化学条件的严格控制、良好的过程灵活性和很高的反应速度,并将耐火材料问题、烟尘问题以及其他采用一般喷嘴或顶吹法时所遇到的问题减小到最低限度。
- ④ At equilibrium these two rates are equal; cupric ion is still reacting with ammonia molecules to form the complex, and the complex is still decomposing, but just as much cupric ammonia complex is being decomposed in unit time as is being formed. 平衡时,这两个(反应)速率相等;铜离子仍与氨分子发生反应以生成络离子,同时络离子仍在分解,但在单位时间

内分解的氨铜络离子正好与生成的(氨铜络离子)一样多。

- ☯ For example, a system initially containing a gaseous mixture of hydrogen, chlorine, and liquid water would very soon closely approach equilibrium with respect to water vapor and liquid water through the evaporation of water until the partial pressure of water vapor in the gaseous phase becomes essentially equal to the vapor pressure of liquid water at the temperature of the system. 例如，原来含有氢、氯和液态水的气液混合体系，就水蒸汽与液态水而言，会很快趋达平衡，这须要通过水的气化(蒸发)，直到气相中水蒸汽的分压基本上等于在该体系温度下液态水的蒸汽压时为止。



## 第3部分 参加国际会议

### 一、如何获取国际会议信息

- 各种学会、协会网站
- 专业期刊杂志
- 会议信息杂志
- 零散的会议宣传资料
- 各行业的常规学术会议

### 二、如何进行学术演讲

对于科技工作者来说,作学术演讲这样的口头交流与专业期刊上发表论文这样的书面交流同等重要,所不同的是,在大多数情况下学术演讲是一种与同行专家面对面的交流。作学术演讲是研究人员专业生涯中的常事,各种专业大会、专题讨论会、报告会、座谈会、甚至工业界的交流会,都为科技工作者提供了宣读研究论文或学术报告的机会。为了达到交流的目的,必须十分重视学术演讲的质量。

#### 问 题

学术演讲的成败往往不在演讲内容的正确与否,而在于技术问题。例如,初次进行学术演讲的人常常不知道事先如何去准备,他们会神情紧张地站在观众前面,不知采用何种恰当的语调,甚至出现古怪的目光接触、变化无常的陈述方法、数量过多的幻灯片等问题。他们错误地估计现场听众的兴趣与背景,也不了解自己能提供的信息量与现场听众所能吸收的信息量之间的差距。

#### 影响学术演讲效果的几个重要环节

##### (1) 充分的准备工作

在作学术演讲的准备时,应该牢记:

- ★演讲的目的不仅在于发表某些信息,而且要把这些信息传达给现场听众,达到交流的目的。
- ★所有现场听众对学术演讲的注意时间是有限的,必须在准备阶段很好地组织演讲内容,要突出重点,使听众能清楚地领会这些要点。
- ★充分的准备工作可以使演讲者减少紧张,会更加自信,能比较顺利地把演讲内容有效地传达给现场听众。

##### (2) 演讲稿的准备

- ★明确演讲的目的
- ★确定自己想要表达的要点
- ★选择有效支持要点的资料
- ★选取适当的组织形式整理演讲内容
- ★准备演讲内容的大纲
- ★利用适当的可视教具
- ★选择能提供具体信息的标题
- ★要认真细心地选择适当的标题,标题应能清楚反映出演讲的内容
- ★准备合适的导论

#### 开场白范例

Good morning/afternoon. My name is \_\_\_\_\_, and today I will be describing the results of research on \_\_\_\_\_ conducted at Xi'an Jiaotong University, In China.

Good morning/afternoon. 或 Thank you. It's an honor to be here.

Today I would like to report on \_\_\_\_\_.

Today I will be reporting on \_\_\_\_\_.

This afternoon I will report some of our finding concerning \_\_\_\_\_.

In my report today, I'd like to present a new method for \_\_\_\_\_.

My topic today is \_\_\_\_\_.

Today I will be discussing \_\_\_\_\_.

### (3) 总结

准备简明的总结。一般而言，听众比较重视演讲的开头和结尾。换句话说，听众对演讲最后的内容比较感兴趣，希望从中抓住演讲者总结性的评论或建议。所以演讲者在报告结束前，应以非常简洁的方式重述自己的最重要的结论或建议，以及支持这些要点的主要理由，以便给听众对这些论点留下深刻的印象。

叙述结论之后，演讲者还可自己利用下列句子来鼓励听众提问：If there are any questions, I'd be happy to take them now. If there are any questions, I'd be happy to answer.

如果没有时间让听众提问，则演讲者在作了总结之后，可以用 This concludes my report. Thank you.或 Thank you 来结束演讲。

## 演讲内容的练习

在练习自己的演讲时，应该注意下列事项：

★找到适当重复要点的方法。适当地重提演讲内容的要点，特别是在演讲的总结中重复要点，对于加深听众的印象是必要的。

★想出各部分之间的自然过渡的方式。如果发现无法找到合适的短语或语句用于过渡，则可能是整个演讲内容的结构不合理造成的，遇到这种情况，必须对演讲内容重新组织。实际上，最好的转接方式是自然地介绍新的次题目。在转接时，演讲者可利用如 Now let me describe...或 Next, let's look at...等语句，以使听众在这些句子的引导下注意下面要介绍的内容。

★应事先自己准备听众可能提出的问题

当听众提出了演讲者无法回答的问题，应该直接表示自己不知道或不确定应该如何回答，如可以坦白地说 We don't have the answer to that yet.、We aren't sure about that yet. 或 We are still working on that question.。事实上，解决这些不能给出答案的问题正好应该是演讲者今后进一步开展研究工作的任务。

## 三、注意事项

➤多采用以简单的词所组成的简短的句子，避免使用冗长、生硬的句子。

➤讲时发音要清晰，声音要宏亮。控制说话的速度，尽量要慢些。一定要把英语单词中的元音发出来。确保每一个英语单词的最后一个音节都发音清楚，尤其是字尾是辅音时。所说的每一个句子必须是完整的句子。

➤掌握自己专业领域中常用英语单词的正确发音方法。

➤应将演讲内容中所有的关键词都包含在可视教具中，以便使听众能从口头及教具上都可理解演讲中提出的某个词。

➤不要过分担心演讲中出现些小小的语法错误。听众并不特别注意我们的英语表达是否完美，而是特别关心我们能否以清楚的方式对他们提供一些有价值的信息。

整理：老乡

2011年05月11日