

同济大学材料科学与工程学院复试试题

专业英语笔试

2019.3

英文名词解释 (18 题选 10 题 , 每题 5 分 , 共 50 分)

1. Thermal Analysis: A group of techniques in which a property of a sample is monitored against time or temperature while the temperature of the sample, in a specified atmosphere, is programmed.
2. Differential Thermal Analysis : DTA is a technique for recording the difference in temperature between a substance and a reference material against time or temperature as the two specimens are subjected to identical temperature regimes in an environment heated or cooled at a controlled rate.
3. Differential Scanning Calorimetry: DSC is a technique for recording the energy required to keep a zero temperature difference between a sample cell and a reference cell that are either heated or cooled at a controlled rate.
4. Thermomechanical Analysis: Thermomechanical analysis (TMA) is a technique that measures the deformation of a substance under non-oscillatory (不摆动的) load or strain as a function of temperature or time.
5. Thermogravimetric Analysis: A technique in which the mass of a substance is measured as a function of temperature, while the substance is subjected to a controlled temperature programme.
6. Chromophore (生色基团): A chromophore is the part of a molecule responsible for its color. The color arises when a molecule absorbs certain wavelengths of visible light and transmits or reflects others. The chromophore is a region in the molecule where the energy difference between two different molecular orbitals falls within the range of the visible spectrum. Visible light that hits the chromophore can thus be absorbed by exciting an electron from its ground state into an excited state.
7. Auxochrome (助色基团): An auxochrome is a functional group of atoms with non- bonded electrons which alters both the wavelength and intensity of absorption when attached to a chromophore.
8. Vibrational spectroscopy Vibrational spectroscopy is concerned with the detection of transitions between energy levels in molecules that result from stretching and bending vibrations of the interatomic bonds.

9. Raman spectroscopy: Raman spectroscopy is concerned with detection of light scattered inelastically by molecules interacting with incident monochromatic 单色 radiation.
10. Group frequency Vibrational frequencies of particular chemical groups in molecules tend to behave largely independently of the rest of the molecule of which they are apart. The absorption frequencies for a particular chemical group are essentially constant and are always characteristic, therefore named as group frequencies.
11. Nuclear Magnetic Resonance spectroscopy: NMR spectroscopy: is concerned with the detection of absorption or emission of EM radiation by stimulated transitions between energy levels in the system under investigation. Since the energy levels are influenced by the environment of the nuclei, the resulting spectrum gives more or less direct evidence regarding the chemical nature of interacting atoms, both qualitatively and quantitatively.
12. Chemical shift: Chemical shift (化学位移) (): the difference between the position of resonance line of a certain proton and that of proton of a standard substance. (expressed in ppm)
13. Integral height: The area under the peaks (integral height) in NMR spectrum represents the signal intensity. The signal intensity is proportional to the number of nuclei in the molecule.
14. Mass spectrometry: Mass spectrometry (MS) is an analytical technique that measures the mass-to-charge ratio of charged particles. It is used for determining masses of particles, for determining the elemental composition of a sample or molecule, and for elucidating the chemical structures of molecules.
15. Nitrogen rule (1) For molecules only containing C, H and O, the mass of molecular ion is even;
 (2) Molecules with even N have even molecular ion mass and molecules with odd N have odd molecular ion mass;
 (3) That is to say, if the mass is an even number, the compound contains no nitrogen or an even number of nitrogens. If the mass is an odd number, the compound contains an odd number of nitrogens.
16. Molecular ion: For an organic molecule consisting of atoms A, B, C and D, fragmentation may take place as the following situations.

$$ABCD + e(-) \rightarrow ABCD(+) + 2e(-)$$
 Ion $ABCD^+$ generated in equation is molecular ion.
17. Ion source: An ion source is an electro-magnetic device that is used to create

charged particles. These are used primarily to form ions for mass spectrometers.

18. Fragmentation ion: Peaks with mass less than the molecular ion are the result of fragmentation of the molecule. These peaks are called daughter peaks or fragmentation ion peaks.