淡江大學九十二學年度碩士班招生考試試題

系別：化學工程與材料工程學系　　科目：材　料　科　學

准帶項目請打「○」否則打「×」
簡單型計算機
×

本試題共 1 頁

1. Cite the main differences between ionic, covalent, and metallic bonding. [15 pts]

2. Explain why hydrogen fluoride (HF) has higher boiling temperature than hydrogen chloride (HCl) (19.4 vs. -85 °C), even HF has a lower molecular weight. [10 pts]

3. What are differences between crystalline, noncrystalline, and amorphous materials? [15 pts]

4. What are solid solutions? What type of solid solution is formed after *BO* dissolves into A_2O_3 through the following change? *A* and *B* are metallic elements, and *O* is oxygen. [15 pts].

$$2BO \xrightarrow{A_2O_3} 2B'_A + V_O^{\cdot\cdot} + 2O_O$$

5. What are XRD, SEM, TEM, TGA, and DTA? Explain what information we could obtain for a crystalline material using these measurements. [20 pts]

6. 請以中文說明下列文章之內容： [25 pts]

A colloid is a suspension in which the dispersed phase is so small (~1 – 1000 nm) that gravitational forces are negligible and interactions are dominated by short-range forces, such as van der Waals attraction and surface charges. The inertia of the dispersed phase is small enough that it exhibits Brownian motion, a random walk driven by momentum imparted by collisions with molecules of the suspending medium. A sol is a colloidal suspension of solid particles in a liquid. An aerosol is a colloidal suspension of particles in a gas (the suspension may be called a fog if the particles are liquid and a smoke if they are solid) and an emulsion is a suspension of liquid droplets in another liquid. All of these types of colloids may be used to produce nanoparticles.