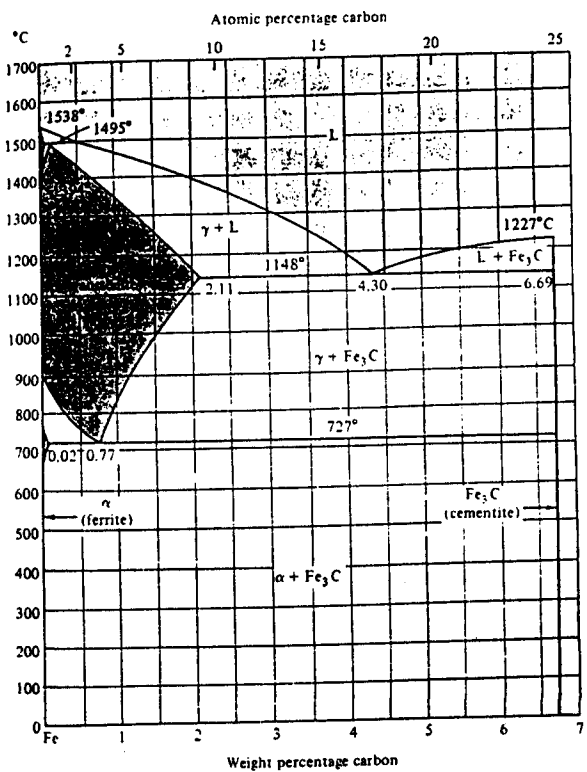
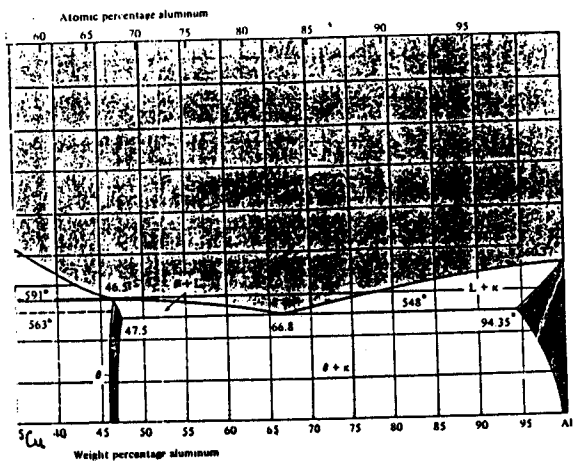


1. a. 試述溫度對 thermoplastic polymer 及 thermosetting polymer 機械性質之影響。由微結構之觀點討論此影響之原因。
 b. 以 modulus of elasticity versus temperature curve 討論其 viscouelastic behavior

2. 一內海捕魚用之鋼(Steel)製漁船,船底使用銅製之螺旋槳及舵。此漁船使用二、三年後將會受到什麼樣的 environmental degradation? 有何辦法可延長此漁船之使用年限?

3. 一鋁合金(5 wt % Cu) 經過 cold rolling 後,其結構 microstructure 及機械性質 mechanical property 會有什麼樣的變化? 述其原因。若要增加其 ductility 應再經過什麼樣的處理。

4. 試述 - hypoeutectoid steel (0.50 wt % C) 經 a. slow cooling b. quenching 後其微結構 (microstructure) 變化之情形。



本頁(第二頁)請與第一頁分開筆中作答。

從下列七題中任選五題作答(最多五題, 超過扣分)

1. Draw a unit cell (such as simple cubic), then indicate (100) and $[100]$, (111) and $[111]$, (112) and $[112]$.
2. Describe briefly the principle of X-ray diffraction for determining a crystal structure.
3. Describe the Schottky and Frenkel types of defect in a pure ionic crystal.
4. The metal or ceramic powders can be solid state sintered to a strong solid material. Please explain the mechanisms from the thermodynamic viewpoints.
5. With band model, please indicate the positions of conduction band, valence band, donor state, acceptor state and Fermi level in a n-type and p-type semiconductors.
6. A thermocouple can be used to measure the temperature of a furnace, please describe the mechanisms.
7. In recent years, the high temperature superconductors attracted many people's attention, what do you know about these kinds of materials?