

共五題，滿分 100 分。

1. (25 %) Please compare the atomic bonding, mechanical properties, thermal properties, and electrical properties of metals, ceramics, semiconductors, and polymers.
2. (15 %) Below are listed the atomic weight, density, and atomic radius for three hypothetical alloys. For each determine whether its crystal structure is FCC, BCC, or simple cubic and then justify your determination.

alloy	Atomic Weight (g/mol)	Density (g/cm <sup>3</sup> )	Atomic Radius (nm)
A	43.1	6.40	0.122
B	184.4	12.30	0.146
C	91.6	9.60	0.137

3. (20 %) Please choose a typical example of binary isomorphous systems and plot the corresponding phase diagram. What are the characteristics of their phase behavior and properties? Please choose two properties for discussion.
4. (20 %) Please give at least five differences of properties between the crystalline and amorphous states of polymers? How do you experimentally detect these differences?
5. (20 %) How do you choose/design polymers, which have the (a) rubbery, (b) thermosetting, (c) crystalline, (d) conducting characteristics, respectively. Please give examples.

試題隨卷繳回