

系所組別： □腔醫學研究所丙組

考試科目： 材料科學

考試日期：0307，節次：2

※ 考生請注意：本試題 可 不可 使用計算機

1. Please explain why FCC (face-centered cubic) metals are typically more brittle than and BCC (body-centered cubic) metals. (10%)
2. Sketch the unit cells for hexagonal close-packed crystal structures, and sketch the (0111) and (2110) planes in a hexagonal unit cell. (10%)
3. Describe recrystallization in terms of both the alteration of microstructure and mechanical characteristics of the material. (10%)
4. Compare the mechanism of crack propagation for both ductile and brittle modes of fracture. (10%)
5. Why a metal having small grains is stronger than one having large grains? (10%)
6. List and briefly describe at least three testing methods of mechanical properties of materials. (10%)
7. Calculate the radius of a vanadium atom, given that V has an BCC crystal structure, a density of  $5.96 \text{ g/cm}^3$ , and an atomic weight of 50.9 g/mol. (10%)
8. Explain (a) cold working, (b) coordination number, (c) edge dislocation, (d) sintering, (e) plastic deformation. (20%)
9. Describe four features of the solute and solvent atoms that form the substitutional type solid solution. (10%)