

# 國立彰化師範大學 98 學年度碩士班招生考試試題

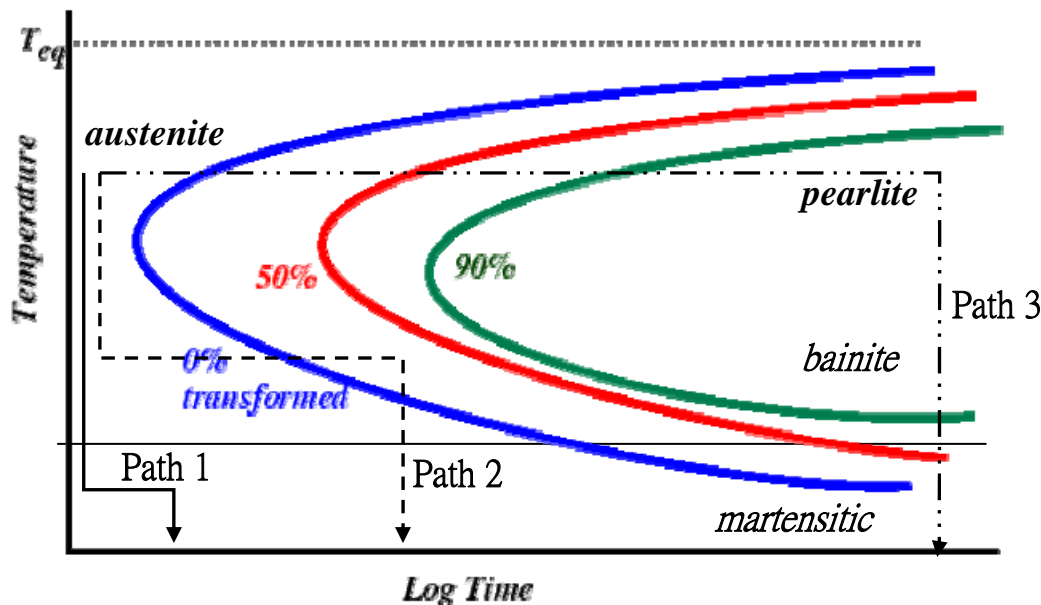
系所：顯示技術研究所

科目：戊、材料學

☆☆請在答案紙上作答☆☆

共 1 頁，第 1 頁

- (a) Draw the structures of bcc, fcc, and hcp metal crystals. (b) Calculate the planar density of atoms in the (111) plane of bcc chromium (atomic radius = 0.125 nm). (c) Repeat (a) for fcc aluminum (Atomic radius = 0.143). (d) How to use an x-ray diffractometer to determine the lattice structures? Briefly explain the setup and the principle. (20%)
- The figure below shows a Time-Temperature Transformation (TTT) diagram, describe what transformations happen in: (20%)
  - Path 1 (line \_\_\_\_\_)
  - Path 2 (line - - - -)
  - Path 3 (line - . . -)
  - Explain the following terms: (1) precipitation hardening (2) annealing



- (a) Plot modulus of elasticity versus temperature curves of thermoplastic, thermosetting polymers and elastomers. (b) Define and mark the glass transition and melting temperatures. (c) Using Fresnel's formula, calculate the reflectance of a sheet of epoxy (the refractive index of the epoxy = 1.5). (20%)
- Explain the following effects (a) Hall effect, (b) Seebeck (thermoelectric) effect, (c) Piezoelectric effect, and (d) elasto-optical effect. (20%)
- (a) Using energy band diagram, compare the difference between conductor, semiconductor, and insulator. (b) Give a general conductivity expression (formula) for intrinsic semiconductor. (20%)