國立中央大學八十九學年度碩士班研究生入學試題卷

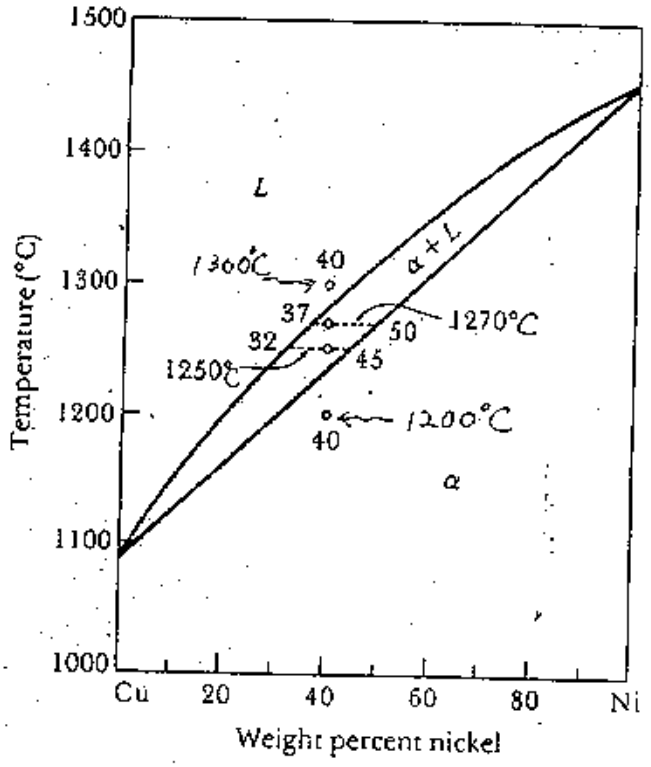
50 所別：光電科學研究所　不分組　科目：材料工程　共 2 頁 第 1 頁

(30) 1. (a) From the data below, estimate the recovery, recrystallization, and grain growth temperatures of the cold-worked metal. (b) At what temperature would you stress relieve the metal? (c) At what temperature would you hot work the metal?

參考用

Annealing Temperature (℃)	Electrical Conductivity ($\times 10^5\ \Omega^{-1}cm^{-1}$)	Tensile Strength (psi)	Grain Size (mm)
125	4.5	85,000	0.150
175	4.5	85,000	0.150
225	6.0	85,000	0.150
275	6.1	85,000	0.150
325	6.1	57,000	0.005
375	6.2	54,000	0.007
425	6.2	52,000	0.010
475	6.3	49,000	0.030
525	6.3	47,000	0.050
575	6.4	46,000	0.080
625	6.4	45,000	0.125
700	6.4	44,000	0.200

(30) 2. Tie lines and phase compositions for a Cu-40% Ni alloy at several temperatures (1300℃, 1270℃, 1250℃, 1200℃) are shown in the following figure. Please determine the composition of each phase at the above-mentioned temperatures under equilibrium conditions. Please also describe what will happen under rapid cooling (i.e., nonequilibrium solidification).



注意：背面有

(10) 3. Explain (a) Degree of polymerization; (b) Cross-linking; (c) Glass-transition temperature of polymer; (d) Thermoplastic polymers; (e) Thermosetting polymers.

(20) 4. Please draw a figure and explain the effect of temperature on the conductivity of an extrinsic semiconductor.

(10) 5. Explain the following terminologies related to corrosion: (a) Anodic protection; (b) Cathodic protection; (c) Pitting corrosion; (d) Polarization curves.