

Assignment #18

9.10(bdfh) *Cite the phases that are present and the phase compositions for the following alloys:*

- (b) 75 wt% Sn–25 wt% Pb at 175°C (245°F)*
- (d) 30 wt% Pb–70 wt% Mg at 425°C (795°F)*
- (f) 37 lb_m Pb and 6.5 lb_m Mg at 400°C (750°F)*
- (h) 4.5 mol Sn and 0.45 mol Pb at 200°C (390°F)*

9.13 *A copper-nickel alloy of composition 70 wt% Ni–30 wt% Cu is slowly heated from a temperature of 1300°C (2370°F).*

- (a) At what temperature does the first liquid phase form?*
- (b) What is the composition of this liquid phase?*
- (c) At what temperature does complete melting of the alloy occur?*
- (d) What is the composition of the last solid remaining prior to complete melting?*

9.24 *For 11.2 kg of a magnesium–lead alloy of composition 30 wt% Pb–70 wt% Mg, is it possible, at equilibrium, to have α and Mg₂Pb phases with respective masses of 7.39 and 3.81 kg? If so, what will be the approximate temperature of the alloy? If such an alloy is not possible, then explain why.*

9.29 *A 45 wt% Pb–55 wt% Mg alloy is rapidly quenched to room temperature from an elevated temperature in such a way that the high-temperature microstructure is preserved. This microstructure is found to consist of the α phase and Mg₂Pb, having respective mass fractions of 0.65 and 0.35. Determine the approximate temperature from which the alloy was quenched.*