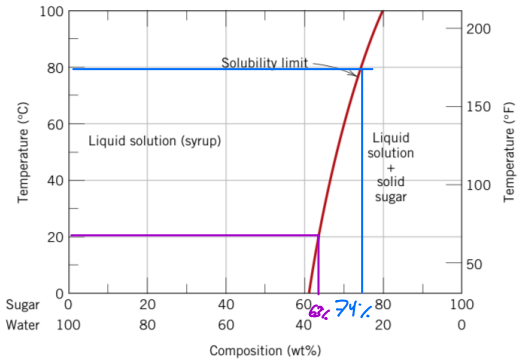
Trevor Swan

ENGR145 HW4

10.1)



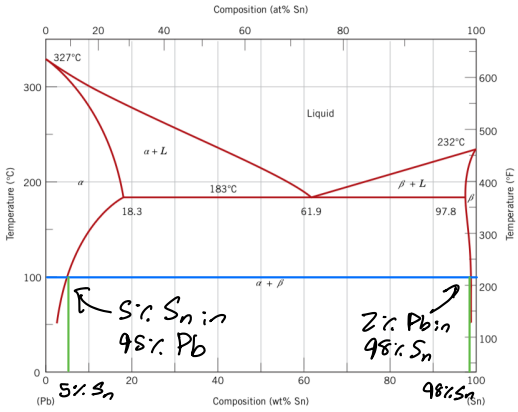
a) $74\text{ wt\% sugar} = \frac{m_s}{m_s + 1000_g} \times 100$

$0.74 m_s + 740 = m_s$ $\quad m_s = 2846.153_g$

$740 = 0.26 m_s$

b) 64 wt% sugar

10.2)

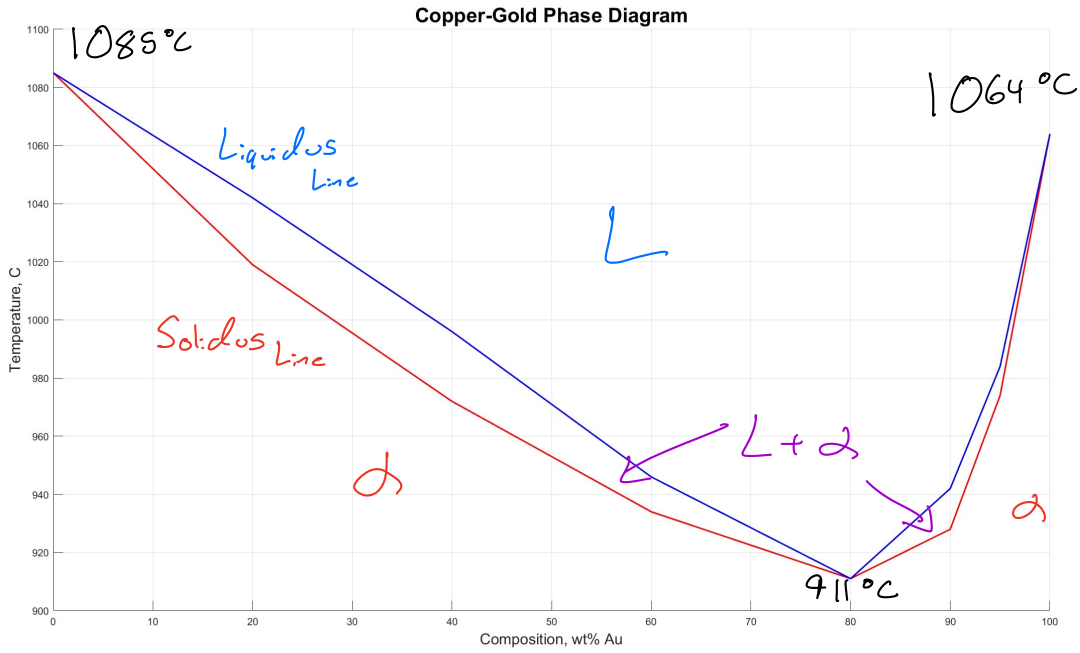


At 100°C, max solubility is

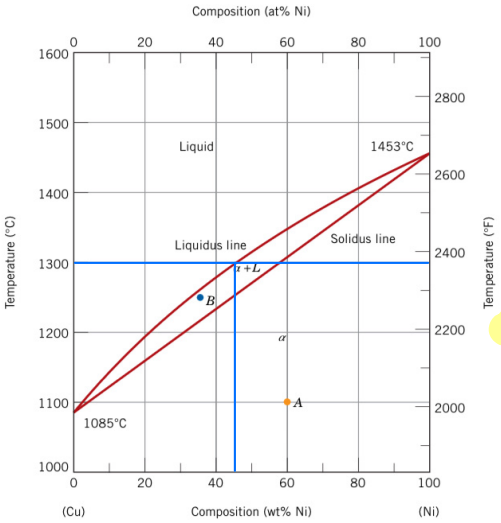
a) about 2 wt% for Pb in Sn

b) about 5 wt% for Sn in Pb

10.7)



10.8)



Copper mass = 1750 g

wt% Ni = 45 % @ 1300°C

w = total weight

$0.55w = 1.75\,kg \quad m_{Ni} = 0.45w$

$0.55\left(\frac{m_{Ni}}{0.45}\right) = 1.75\,kg$

$m_{Ni} = 1.43\,kg$

Thought question: Copper is close to both Ni and Ag on the periodic table. However, Cu and Ni show complete solubility in the solid state, while Cu and Ag show only partial solubility. Why might this be the case?

Cu and Ni show complete solubility most likely due to their very similar electron configurations. Cu has one more valence electron than Ni, and this makes them very similar atoms. Their similarity most likely correlates to an increased solubility. Cu and Ag, on the other hand, very greatly in configuration. Most notably, Ag has an extra d orbital and has many more inner electrons. The nucleus is more shielded by its electron orbitals, so this most likely correlates to decreased, or partial, solubility between Cu and Ag.