PHYS 321 Problems in Specification of Composition Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Use these for problems starting on the next page.

Composition (or Concentration) and Composition conversion equations for two-element alloy

1. Weight (or mass) percent composition:

 

1. Atom percent composition:

   

1. Conversion of weight percent to atom percent:

  

1. Conversion of atom percent to weight percent:

  

1. Conversion of weight percent to density:

 

1. Computation of density:

 

1. Computation of Atomic weight :

 

4.7 What is the composition, in atom percent, of an alloy that consists of 30 wt% Zn (atomic weight = 63.55 g/mol) and 70 wt% Cu (atomic weight = 65.39 g/mol)?

4.8 What is the composition, in weight percent, of an alloy that consists of 6 at% Pb (atomic weight = 207.2 g/mol) and 94 at% Sn (atomic weight = 118.71 g/mol)?

4.9 Calculate the composition, in weight percent, of an alloy that contains 218.0 kg titanium, 14.6 kg of aluminum, and 9.7 kg of vanadium.

4.10 What is the composition, in atom percent, of an alloy that contains 98 g tin (atomic weight = 118.71 g/mol) and 65 g of lead (atomic weight = 207.2 g/mol)?

4.16 Determine the approximate density of a high-leaded brass that has a composition of 64.5 wt% Cu, 33.5 wt% Zn, and 2.0 wt% Pb. Densities: $ρ\_{Cu}=8.94 g/cm^{3}$, $ρ\_{Zn}=7.13\frac{g}{cm^{3}},ρ\_{Pb}=11.35 g/cm^{3}$.

4.25 Silver and palladium both have the FCC crystal structure, and Pd forms a substitutional solid solution for all concentrations at room temperature. Compute the unit cell edge length for a 75 wt% Ag–25 wt% Pd alloy. The room-temperature density of Ag is 10.49 g/cm3and its atomic weight is 107.9 g/mol. The room-temperature density of Pd is 12.02 g/cm3 and its atomic weight is 106.4 g/mol.