MAE 2321-001  
Spring 2008  
HOMEWORK #4

Assigned Feb 12, 2008  
Due Feb 19, 2008

Chapter 5

When needed, use tables in your book for information such as atomic weight, density, etc.

1.  
a. Calculate the fraction of atom sites which are vacant for Si at its melting temperature of 1410°C, and at 27°C. Assume an energy for vacancy formation of 4 eV/atom.  
b. Calculate the number of vacancies per cubic centimeter of Si at 27°C.

2.  
Carbon C forms a solid solution with austenite (the high temperature FCC phase of Fe). The maximum C content is 2.14 weight%, at this composition calculate the atomic percent Fe and C.

3.  
White 18 carat gold can be made with 17.3 mole % nickel, 5.5 mole % zinc and 2.2 mole % copper (the rest is Au) and is silver in appearance.  
a. Calculate the weight percent of each of the 4 elements in this composition of white gold.  
b. Calculate the weight of Ni (in grams) in a pendant that weighs 7 grams.

4.  
Calculate the number of atoms per cubic centimeter of a) Cu and b) Au.

Book 5.9  
Book 5.20

5.  
Calculate the density (g/cm³) of the composition in problem 3.  
Book 5.28  
Book 5.32