

Chemistry 2C, Spring 2017, Assignment 4:

Posted: 4/30/2017

Due: 5/6/2017

Please return the homework in class as a hardcopy. The expectation is that you use letter-size or equivalent paper for your answers. Staple sheets of papers together. Write your name.

Chapter 16:

1. Calculate the packing efficiency of atoms in (i) simple cubic, (ii) body-centered cubic, and (iii) face-centered cubic unit cells. Show all the steps.
2. Sketch as best you can, the difference between cubic close-packing and hexagonal close packing. How many atomic neighbors does each atom have in the two distinct structures, and describe the way the neighboring atoms are arranged.
3. Iridium (Ir) is the second densest stable element with approximately three times the density of Fe. The density of Ir is close to $2.256 \times 10^4 \text{ kg m}^{-3}$. Ir is known to have the fcc crystal structure. Use the atomic mass of Ir (192.22 amu) and the density, to estimate the edge of the cubic unit cell of Ir, and also the metallic radius of Ir atoms.
4. Sketch the diamond and zinc blende ZnS structures in sections, and describe how the atoms are related. How many atoms in the unit cell of each?