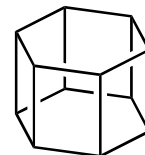


unit cell edge (fcc) =  $(8)^{1/2}$  atom radius

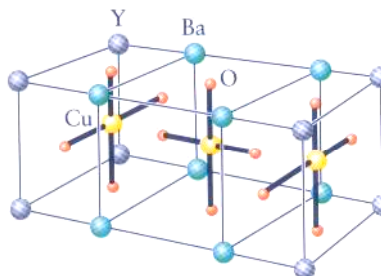
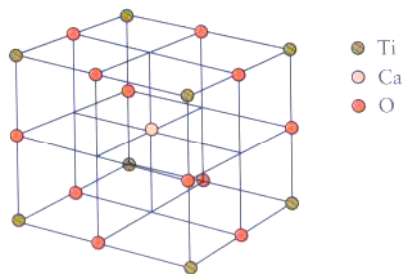
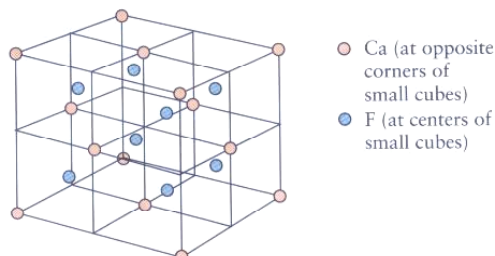
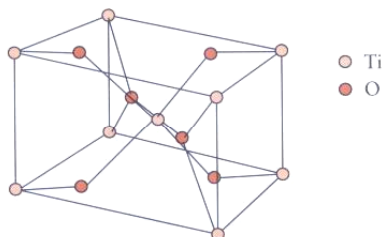
unit cell edge (bcc) =  $(16/3)^{1/2}$  atom radius

- 1) a) Iron has a body-centered cubic structure and its atomic radius is 126 pm. What is the volume of the unit cell in  $\text{cm}^3$ ?
- b) Lead has a face-centered cubic structure and its atomic radius is 175 pm. What is the volume of the unit cell in  $\text{cm}^3$ ?

- 2) a) How many atoms are in a hexagonal closest-packed unit cell? (top and bottom are hexagons, sides are rectangles (web page); 3 atoms are inside cell, one atom on each corner, and one atom on top and bottom face)



- b) How many atoms are in a cubic unit cell that has three atoms inside the cell, 4 atoms on corners, 2 atoms on faces and 2 atoms on edges?
- c) The sodium chloride cubic unit cell has chloride ions on each corner and on each face. The sodium ions are at the center and one on each edge. How many of each ion are in the unit cell?
- d) Determine the formulas of each compound from the unit cell pictures below. (Each picture is one unit cell)



- 3) Chromium (Cr 52.00 g/mole) has a body-centered cubic structure and an atomic radius of  $1.25 \times 10^{-8}$  cm. Calculate the density of chromium in  $\text{grams/cm}^3$ . ( $N_{\text{Avo}} = 6.02 \times 10^{23}$ )
- 4) Silver (Ag) has a face-centered cubic structure with an edge length of 408.6 pm. The density of silver is  $10.5 \text{ grams/cm}^3$ . Calculate the mass of one silver atom. Calculate the molar mass of silver. ( $N_{\text{Avo}} = 6.02 \times 10^{23}$ )
- 5) Platinum (Pt 195.08 g/mole) has a face-centered cubic structure and a density of  $21.45 \text{ grams/cm}^3$ . Calculate the volume and edge length of the unit cell.