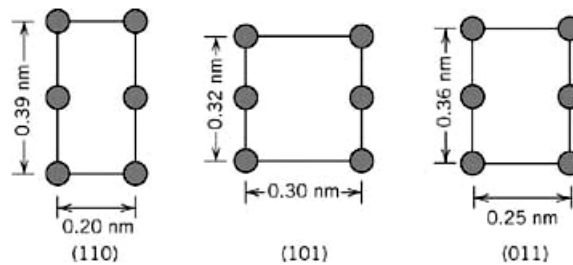


Homework

5. A hypothetical AX type of ceramic material is known to have a density of 2.10 g/cm^3 and a unit cell of cubic symmetry with a cell edge length of 0.57 nm . The atomic weights of the A and X elements are 28.5 and 30.0 g/mol , respectively. On the basis of this information, which of the following crystal structures is (are) possible for this material: sodium chloride, cesium chloride, or zinc blende? Justify your choice(s).
6. Compute the atomic packing factor for the diamond cubic crystal structure (Fig. 3.16).
7. Sketch a monoclinic unit cell, and within that cell a $[-101]$ direction.
8. Below are shown three different crystallographic planes for a unit cell of some hypothetical metal. The circles represent atoms:



- (a) To what crystal system does the unit cell belong?
- (b) What would this crystal structure be called?
- (c) If the density of this metal is 18.91 g/cm^3 , determine its atomic weight.