Session #16: Homework Problems

Problem #1

For the element copper (Cu) determine:

(a) the distance of second-nearest neighbors.

(b) the interplanar spacing of {110} planes.

Problem #2

Consider a (111) plane in an FCC structure. How many different [110]-type directions lie in this (111) plane? Write out the indices for each such direction.

Problem #3

Determine for barium (Ba) the linear density of atoms along the <110> directions.

Problem #4

For aluminum (Al) at 300K, calculate the planar packing fraction (fractional area occupied by atoms) of the (110) plane and the linear packing density (atoms/cm) of the [100] direction.

Problem #5

Sketch a cubic unit cell and in it show the following planes: (111), (210), and (003).

Problem #6

Braquium (Bq) is simple cubic. Calculate the atomic density (atoms/cm^2) in the (011) plane of Bq. The molar volume of Bq is 22.22 cm^3.

Problem #7

(a) What are the coordinates of the largest interstitial hole in the FCC structure? (Hint: where should we put an extra atom if we were looking for the most room?)

(b) How many of these sites are there per unit cell?

Problem #8

What is the family of planes {hkl} with an interplanar spacing of d = 1.246 Å in nickel (Ni) with a = 3.524 Å?

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