

Problem Set #2: Diffraction

1. Show that the fundamental reciprocal lattice vectors of a simple cubic lattice with edge length, a , forms another simple cubic lattice. Determine the edge length for the reciprocal lattice unit cell.
2. An x-ray of wavelength 3.1 \AA is used for a diffraction experiment on a crystal with a simple cubic structure with an edge length of 3.5 \AA . Find all sets (family) of planes where diffraction can occur.
3.
 - a) Find the expression for the geometrical structure factor for a BCC crystal structure in which all atoms are identical.
 - b) Find the expression for the geometrical structure factor for a FCC crystal structure in which all atoms are identical.
 - c) A crystal is known to exhibit either a BCC or FCC crystal structure. It is found that there is a diffraction peak for the (111) plane of the crystal. Does the crystal have BCC or FCC orientation? Explain your answer.