CHAPTER 3

3.57 *(a) Derive linear density expressions for BCC [110] and [111] directions in terms of the atomic radius R.*

(b) Compute and compare linear density values for these same two directions for tungsten (W).

3.59 *(a) Derive planar density expressions for BCC (100) and (110) planes in terms of the atomic radius R.*

(b) Compute and compare planar density values for these same two planes for vanadium (V).

3.64 *Using the data for aluminum in Table 3.1, compute the interplanar spacing for the (110) and (221) set of planes.*

3.65 *Determine the expected diffraction angle for the first-order reflection from the (113) set of planes for FCC platinum (Pt) when monochromatic radiation of wavelength 0.1542 nm is used.*

3.67 *The metal rubidium (Rb) has a BCC crystal structure. If the angle of diffraction for the (321) set of planes occurs at 27.00° (first-order reflection) when monochromatic x-radiation having a wavelength of 0.0711 nm is used, compute the following: (a) the interplanar spacing for this set of planes and (b) the atomic radius for the Rb atom.*

3.69 *Figure 3.25 shows the first four peaks of the x-ray diffraction pattern for copper (Cu), which has a FCC crystal structure; monochromatic x-radiation having a wavelength of 0.1542 nm was used.*

(a) List the Index (i.e., give h, k, and l indices) for each of these peaks.

(b) Determine the interplanar spacing for each of the peaks.

(c) For each peak, determine the atomic radius for Cu, and compare these with the value presented in Table 3.1.