

3.58 We first calculate the lattice parameter using Equation 3.3 and the value of R (0.1249 nm) cited in Table 3.1, as follows:

$$a = \frac{4R}{\sqrt{3}} = \frac{(4)(0.1249 \text{ nm})}{\sqrt{3}} = 0.2884 \text{ nm}$$

Next, the interplanar spacing for the (310) set of planes may be determined using Equation 3.14 according to

$$d_{310} = \frac{a}{\sqrt{(3)^2 + (1)^2 + (0)^2}} = \frac{0.2884 \text{ nm}}{\sqrt{10}} = 0.0912 \text{ nm}$$

And finally, employment of Equation 3.13 yields the diffraction angle as

$$\sin \theta = \frac{n\lambda}{2d_{310}} = \frac{(1)(0.0711 \text{ nm})}{(2)(0.0912 \text{ nm})} = 0.390$$

Which leads to

$$\theta = \sin^{-1}(0.390) = 22.94^\circ$$

And, finally

$$2\theta = (2)(22.94^\circ) = 45.88^\circ$$