

3.65 (a) Since W has a BCC crystal structure, only those peaks for which  $h + k + l$  are even will appear. Therefore, the first peak results by diffraction from (110) planes.

(b) For each peak, in order to calculate the interplanar spacing we must employ Equation 3.13. For the first peak which occurs at  $40.2^\circ$

$$d_{110} = \frac{n\lambda}{2 \sin \theta} = \frac{(1)(0.1542 \text{ nm})}{(2) \left( \sin \frac{40.2^\circ}{2} \right)} = 0.2244 \text{ nm}$$

(c) Employment of Equations 3.14 and 3.3 is necessary for the computation of  $R$  for W as

$$\begin{aligned} R &= \frac{a\sqrt{3}}{4} = \frac{(d_{hkl})(\sqrt{3})\sqrt{(h)^2 + (k)^2 + (l)^2}}{4} \\ &= \frac{(0.2244 \text{ nm})(\sqrt{3})\sqrt{(1)^2 + (1)^2 + (0)^2}}{4} \\ &= 0.1374 \text{ nm} \end{aligned}$$

Similar computations are made for the other peaks which results are tabulated below:

Peak Index	$2\theta$	$d_{hkl}(\text{nm})$	$R(\text{nm})$
200	58.4	0.1580	0.1369
211	73.3	0.1292	0.1370
220	87.0	0.1120	0.1371
310	100.7	0.1001	0.1371