NAME : Himanshu Dixit
BATCH : B10
ENROLL. NO. : 21103262

DATE: / /
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Physics-2 (1SB11PH211)

Assignment-6

Show that FCC crystals are more closely packed than BCC crystals.

FCC : $(PF)_{FCC} = \dfrac{4 \times \frac{4}{3}\pi\left(\frac{\sqrt{2}a}{4}\right)^3}{a^3} \times 100$ $\left(PF = \dfrac{z \cdot V_c}{V_s} \times 100\right)$

$= 74\%$

$(Z_{FCC} = 4)$

$(\sqrt{2}a = 4r$

$r = \frac{\sqrt{2}}{4}a)$

BCC : $\sqrt{3}a = 4r$

$r = \frac{\sqrt{3}a}{4}$

$(PF)_{BCC} = \dfrac{2 \times \frac{4}{3}\pi\left(\frac{\sqrt{3}a}{4}\right)^3}{a^3} \times 100$

$Z_{BCC} = 2$

$= 54\%$

$PF]_{FCC} > PF]_{BCC}$

hence, FCC crystals are more closely packed than BCC crystals.