



SNS COLLEGE OF TECHNOLOGY

(AN AUTONOMOUS INSTITUTION)
 SNS Kalvi Nagar, Saravanampatti Post
 Coimbatore - 641 035



Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai
 Accredited by NBA & accredited by NAAC with 'A++' Grade, Recognized by UGC

Face Centred Cubic Structure

1. No. of atoms per unit cell

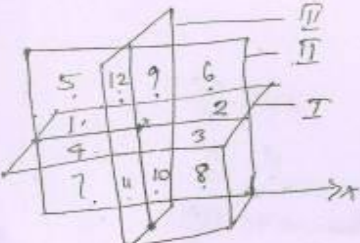
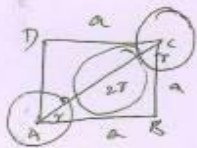
No. of atoms in unit cell from the contribution of Corner atom $\frac{1}{8} \times 8 = 1$
 " " " " " " " " Face-centred atom $\frac{1}{2} \times 6 = 3$

Total no. of atoms in the unit cell = $1 + 3 = 4$

2. Coordination number

face centred atom

$4 + 4 + 4 = 12$

3. atomic radius

A ABC
 $AC^2 = AB^2 + BC^2$
 $(4r)^2 = a^2 + a^2$
 $(4r)^2 = 2a^2$
 $16r^2 = 2a^2 \Rightarrow a^2 = \frac{16r^2}{2} \Rightarrow a = \frac{4r}{\sqrt{2}}$
 $r = \frac{\sqrt{2}a}{4}$

4. PF

No. of atom per unit cell = 4
 $V = 4 \times \frac{4}{3} \pi r^3$
 $V = a^3$
 $\Rightarrow \frac{4 \times \frac{4}{3} \pi r^3}{\left(\frac{4r}{\sqrt{2}}\right)^3} \Rightarrow \frac{16\pi r^3}{3} \times \frac{\sqrt{2} \times \sqrt{2} \times \sqrt{2}}{4 \times 4 \times 4 r^3} = \frac{\sqrt{2} \pi}{6} \Rightarrow 3 \frac{14 \times 1.732}{6}$
 ≈ 14.1