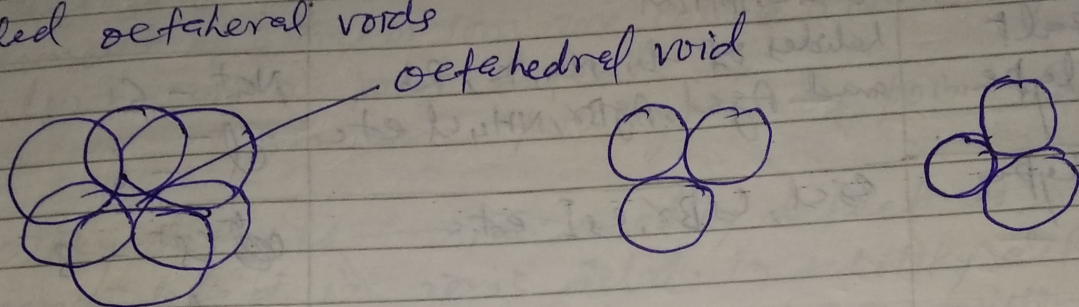


(ii) octahedral voids — The voids between six touching sphere is called octahedral voids



for octahedral voids —

$$\frac{r_{\text{void}}}{r_{\text{sphere}}} = 0.414$$

Hence octahedral void is greater than tetrahedral void.

Radius ratio rule : —

Range of Radius ratio	Co-ordination number	Structural arrangement	Examples
0.155 - 0.225	3	plane triangular	BrO_3
0.225 - 0.414	4	Tetrahedral	ZnS
0.414 - 0.732	6	octahedral	NaCl
0.732 - 1	8	body centred cubic	CsCl

Crystal structure & Co-ordination no.

Crystalline structure	Examples & description	Co-ordination number
1. Rock salt NaCl type	halides of Li, Na, K, Rb and AgCl, AgBr, NH ₄ Cl etc	Na ⁺ - 6 Cl ⁻ - 6
2. CsCl type	CsCl, CsBr, CsI etc	Cs ⁺ - 8 Cl ⁻ - 8
3. Zinc blende (ZnS type)	ZnS, CuCl, CuBr, CuI, AgI etc	Zn ²⁺ - 4 S ²⁻ - 4
4. Fluorite structure (CaF ₂ -type)	CaF ₂ , SrF ₂ , BaF ₂ , BaCl ₂ etc	Ca ²⁺ - 8 F ⁻ - 4
5. Anti fluorite structure	Na ₂ O	Na ⁺ - 4 O ²⁻ - 8

Calculation of density

$$\text{Density} = \frac{\text{Mass}}{\text{Volume}}$$

$$\text{Density of crystal, } \rho = \frac{Z \cdot M}{a^3 \cdot N_A}$$

$$\text{or } d = \frac{Z \cdot M}{a^3 \cdot N_A}$$

where ρ or d = density of crystal

Z or Z = no. of atom in unit cell

A or M = Atomic mass

a = edge

N_A or N_A = Avogadro no.