Task#85360

Predict the coordination number of Ca2+ in CaO crystal and also its crystal structure.

Solution: In order to determine structure of a crystal we have to apply radius ratio rule.

$\frac{r+}{r-}$	Co-ordination number	Structure
1	12	Close packing
1-0.732	8	Cubic
0.732-0.414	6	Octahedral
0.414-0.225	4	Tetrahedral
0.225-0.155	3	Triangular
0.155-0	2	Linear

Where, r^+=radius of Cation & r^-=radius of anion,

Radius of Ca^{2+} ion= 100pm & Radius of O^{2-}ion =145pm (literature value)

$\frac{r+}{r-}=\frac{100}{145}$=0.6896; Since,0.414<0.6896<0.732,

So, Co-ordination number of Ca^{2+} ion is =6;

Structure of CaO is like **NaCl structure**, Where Face cantered cubic(FCC) arrangement of O2- ion with interpenetrating FCC lattice of Ca^{2+} ions.