



CRYSTAL STRUCTURE AND IMPERFECTIONS

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CRYSTAL LATTICE

A regular three dimensional arrangement of constituent particles represented by point in space, is known as **crystal lattice**.

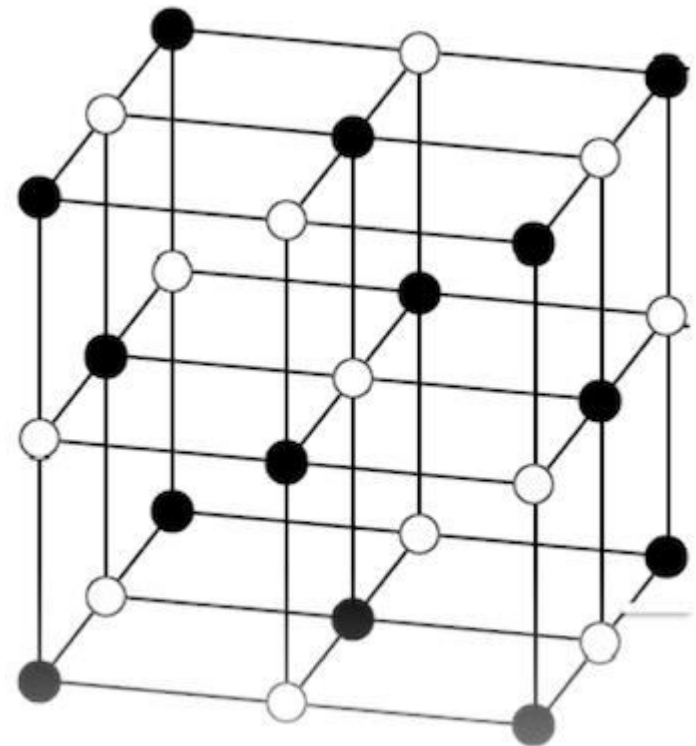
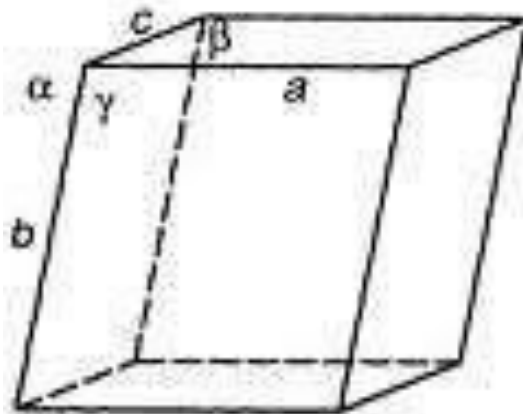


Diagram 1: Example of a Crystal Lattice Structure

UNIT CELL

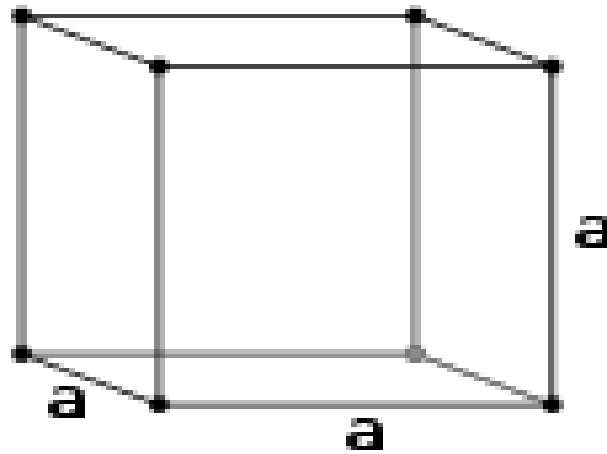
The Smallest portion of a crystal lattice is known as Unit Cell which when repeated in different direction generates the complete lattice.



The Unit Cell

- γ is the angle between a and b
- β is the angle between a and c
- α is the angle between b and c

CUBIC CRYSTAL SYSTEM



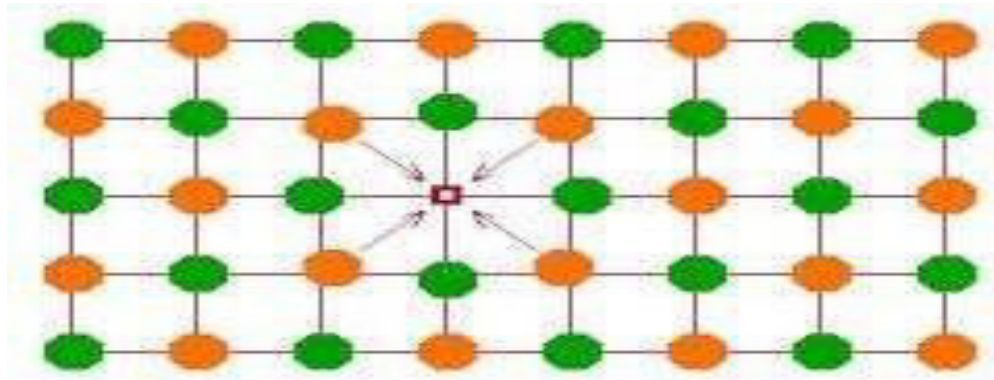
Axial Relationship -> $a=b=c$

Inter axial angle -> $\alpha=\beta=\gamma$

DEFECTS IN SOLIDS

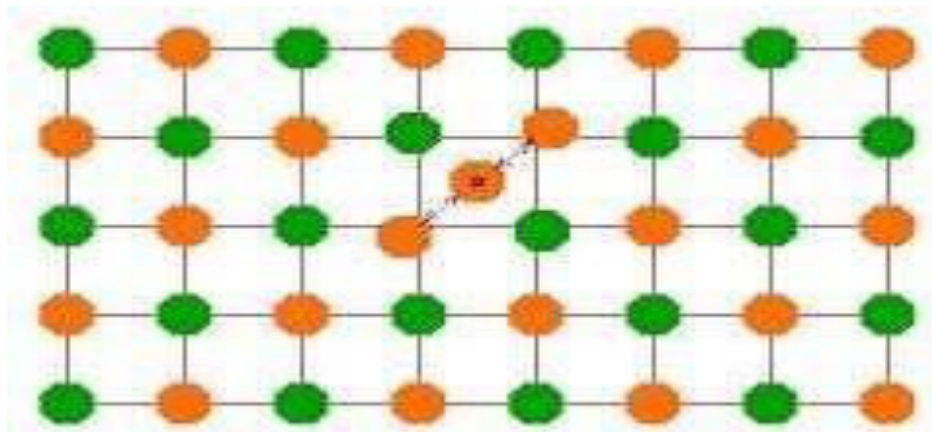
Vacancy Defect - This defect develops in any crystal when some lattice sites are empty. As a result, the density of the substance decreases.

This Defects may develops when some substance heated.



DEFECTS IN SOLIDS

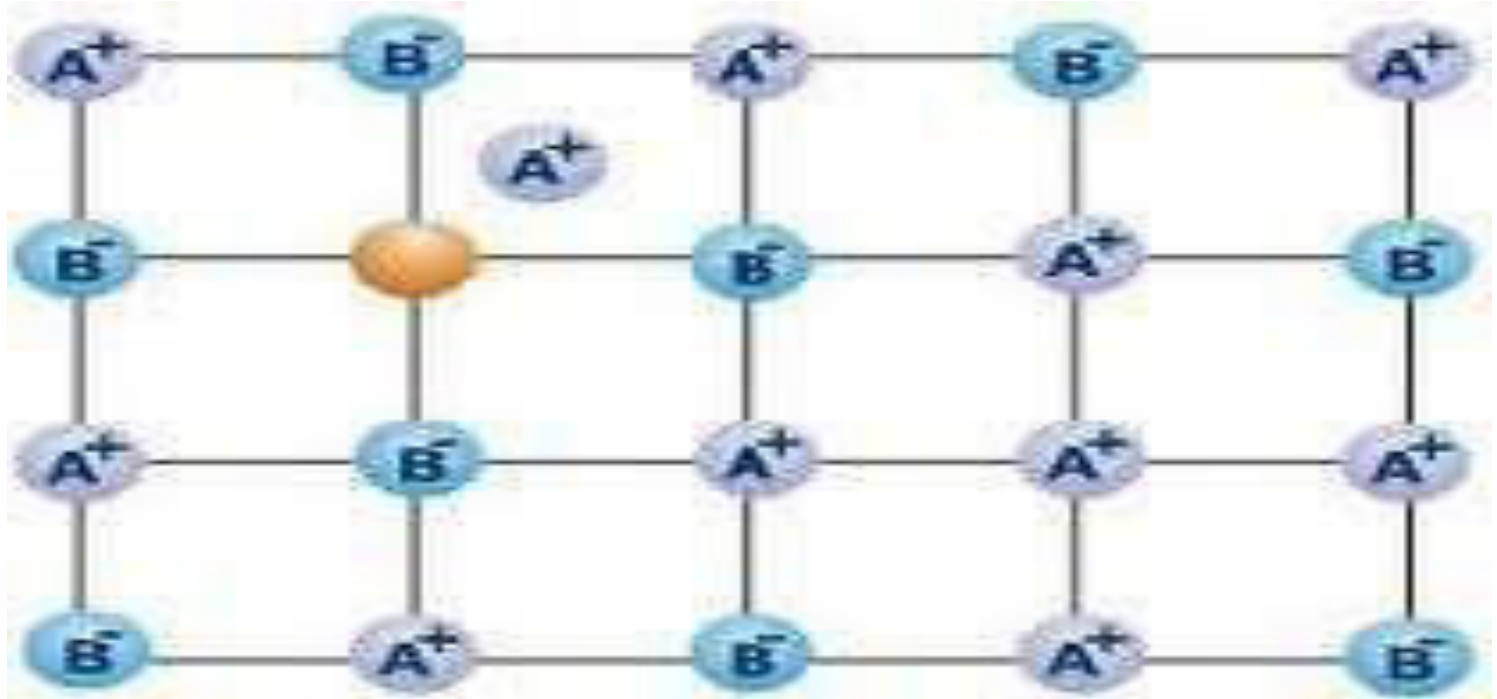
Interstitial Defect – This defect develops when some constituents particles occupy interstitial sites. Due to this defects, the density of the crystal increases.



DEFECTS IN SOLIDS

Frenkel Defect – In this Defect smaller ion (cation) is dislocated from its original sites to an interstitial sites due to which vacancy defect is developed at its original location.

It is also called with the name Dislocation Defect.



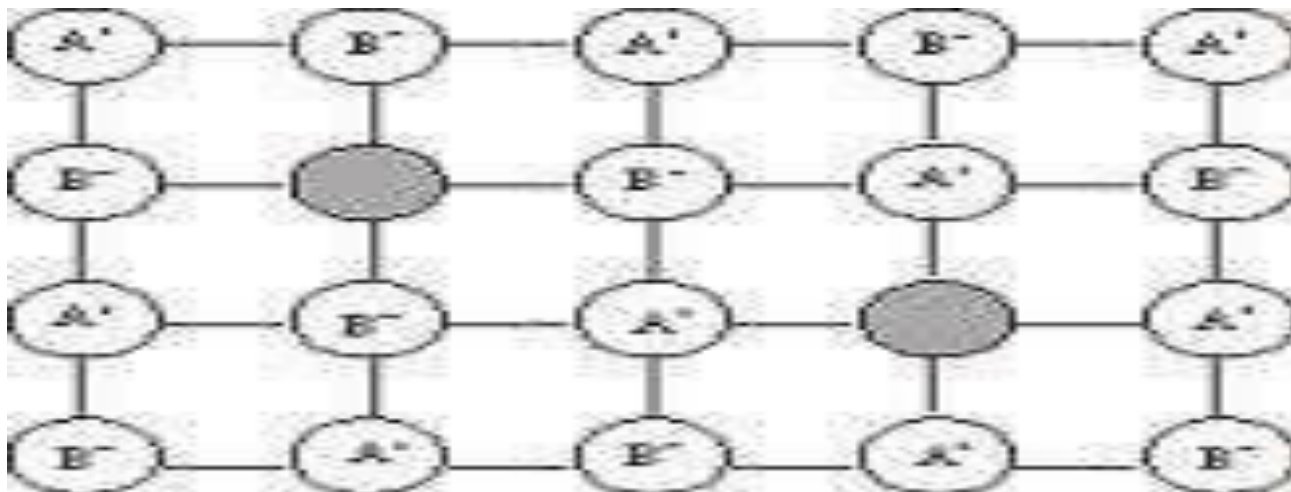
DEFECTS IN SOLIDS

Schottky Defect – This defect develops when some cation & anion are missing from their lattice sites due to which the crystal remains neutral. So, it is a vacancy defect in ionic solid.

Due to Schottky Defect, the density of the crystal decreases.

This defect is shown by those ionic crystal solids in which the cations & anions are of almost similar sizes.

AgBr shows both Frenkel & Schottky Defect.



THANK YOU