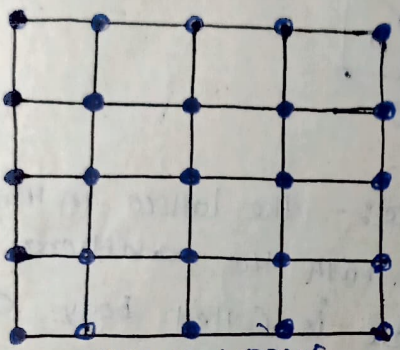
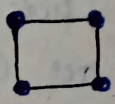
Solids having typical geometrical shapes and fixed inter-facial angles are known as Crystalline. A Crystalline solids are actually true solids.

A Crystalline solid consists of ions, atoms or molecules that make up a Crystal are called Points. A Crystal have well ordered arrangement of their points in Crystals is called space lattice. The positions of these points in crystals are called lattice points. Hence space lattice is an arrangement of points in three dimensional space. The smallest portion of a space lattice which sets the pattern of the whole lattice is known as unit cell. Thus a space lattice is obtained by repeating the unit cell over and over again in three dimenssional space.



SPACE LATTICE



UNIT CELL

Unit cell is like a slice bread four corner are visible and four one are hidden

A unit cell is represented by x, y, & z axes and their angles.

Bravias Lattice

In 1848 Bravias observed on the basis of geometrical consideration that there are 14 (Fourteen) possible ways in which similar points can be arranged in the three dimenssional space

So there can be only fourteen possible space lattices called Bravias lattices.

Generally we consider only seven (07) systems of Crystal Hich gives fourteen Bravias Lattices.

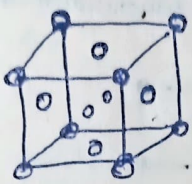
Crystal system	Bravias Lattice
1. Cube	03
2. Orthorhombic	04
3. Tetragonal	02
4. Monoclinic	02
5. Hexagonal	01
6. Triclinic	01
7. Rombohedral	01
Total =	14 Bravias lattice

A Cubic System of Crystal has three bravias lattice. i.e Simple, Face Centred, & Body Centered Cubic lattice.

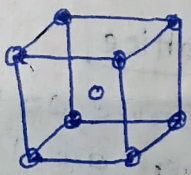
A crystal belongs to Cubic System are Three types of Bravias lattices depending upon the nature of arrangements of points in unit cell.

(1) Simple Cubic Lattice:- The lattice in which points are presents at all corners of the unit cell is called the Simple Cubic lattice.

(2) Face Centred Cubic Lattice:- The lattice in which points are present at all corners as well as at the centres of six faces of the unit cell is called the face centred cubic (F.C.C.) lattice. It is shown as:



(3) Body Centred Cubic lattice:- The lattice in which points are presents at all corners with the additional point at the centre of the unit cell is called body centred cubic lattice. It is represented as follows.



Calculation of the effective number of atoms per unit cell in Simple Cubic, Body Centred & Face Centred lattice.

Simple Cubic Lattice:- In case of Simple Cubic lattice, there are Eight atoms at Eight Corners of the unit cell.

But each atom contributes $\frac{1}{8}$ to the unit cell.

Hence effective number of atoms per unit cell is $8 \times \frac{1}{8} = 1$

Calculation of effective number of atoms in Body Centred Cubic lattice:- In Body Centred cubic lattice There are eight atoms at Eight Corners of the unit cell. But each atom Contributes $\frac{1}{8}$ to the unit cell, Since the central atom is not shared by any other atom, Hence the effective atomic number per unit cell $= 8 \times \frac{1}{8} + 1$

$= 1 + 1$

$= 2$

System	Axial distance	Axial angle	Examples.
Cubic	$a = b = c$	$\alpha = \beta = \gamma = 90^\circ$	NaCl, KCl, Diamond, Cu, Ag, ZnS
Tetragonal	$a = b \neq c$	$\alpha = \beta = \gamma = 90^\circ$	~~ZnS (Zinc Blende)~~ SnO_2, TiO_2, $CaSO_4$
Orthorhombic	$a \neq b \neq c$	$\alpha = \beta = \gamma = 90^\circ$	KNO_3, K_2SO_4, $BaSO_4$, $PbCO_3$ विषम चतुष्फलक
Monoclinic	$a \neq b \neq c$	$\alpha = \gamma = 90^\circ$, $\beta \neq 90^\circ$	$Na_2SO_4 \cdot 10H_2O$, $PbCrO_4$, एकनताक्ष
Hexagonal	$a = b \neq c$	$\alpha = \beta = 90^\circ$, $\gamma = 120^\circ$	ZnO, CdS, PbI_2, ग्रेफाइट
Rhombohedral	$a = b = c$	$\alpha = \beta = \gamma \neq 90$	~~कैल्साइट~~ ($CaCO_3$) क्वार्ट्ज $NaNO_3$ HgS (सिनेबर)
Triclinic	$a \neq b \neq c$	$\alpha \neq \beta \neq \gamma \neq 90^\circ$	$CuSO_4, 5H_2O$, $K_2Cr_2O_7$, H_3BO_3

Note 'Pm' denotes Picometer, Which is 1×10^{-12} meter ($1\ pm = 1 \times 10^{-12}$ meter)

Crystal System	Types of Lattices	
1 Cubic	Simple, f.c.c., body and Centered (b.c.c.)	(03)
2 Tetragonal	Simple, b.c.c.	(02)
3 Ortho rhombic	Simple, f.c.c, b.c.c, end centred	(04)
4 Monoclinic	Simple, end centred.	(02)
5 Rhombohedral	Simple,	(01)
6 Triclinic	Simple	(01)
7 Hexagonal	Simple.	(01)
		14

Seven system.

Bravais lattice