Question

Give the significance of a lattice point

Answer:

A regular three dimensional arrangement of points in space is called a crystal lattice. Each point in a lattice is called lattice point or lattice site. It represents one constituent particle which may be an atom, a molecule (group of atoms) or an ion.

Question

Name the parameters that characterise a unit cell.

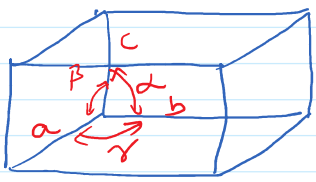
Answer:

A unit cell is characterised by:

i) its dimensions along the three edges a, b and c. These edges may or may not be mutually perpendicular.

ii) angles between the edges, α (between b and c), β (between a and c), γ (between a and b).

Thus a unit cell is characterised by six parameters a, b, c, α, β, γ.



Question

Distinguish between i) Hexagonal and monoclinic unit cells ii) face centred and end-centred unit cells.

Answer:

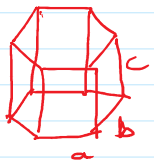
i) Hexagonal Monoclinic

Answer:

i) Hexagonal

$a = b \neq c$

$\alpha = \beta = 90^\circ, \gamma = 120^\circ$



Possible unit cell:
Primitive

Eg: Graphite, ZnO, CdS

Monoclinic

$a \neq b \neq c$

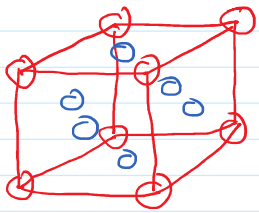
$\alpha = \gamma = 90^\circ, \beta \neq 90^\circ$

Possible unit cell
Primitive,
End Centered

Eg: Monoclinic sulphur, $Na_2SO_4 \cdot 10H_2O$.

ii) Face centered unit cell

Such a unit cell contains one constituent particle present at the centre of each face, besides the ones that are at its corners.



End-centered unit cells:

In such a unit cell, one constituent particle is present at the centre of any two opposite faces besides the ones present at its corners.