| | |
|---|---|
| Smallest basis vector | Basis vector need not be smallest. |

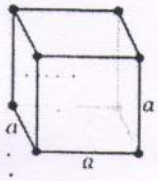
**Crystal System:**

There are 14 Bravais lattices in 3 dimension. These are grouped into 7 crystal systems. They are,

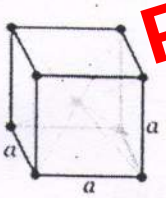
1. **Cubic,**
2. **Tetragonal,**
3. **Orthorhombic,**
4. **Monoclinic,**
5. **Triclinic,**
6. **Trigonal and**
7. **Hexagonal**

There are 4 different lattices: i. Simple, ii. Body centre , iii. Face centre and iv. Base centre

**Simple**: A simple lattice has points only at corner positions of the unit cell.

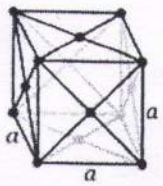



**Body center**: A body center lattice has points at the corner positions and one at the center of the body.



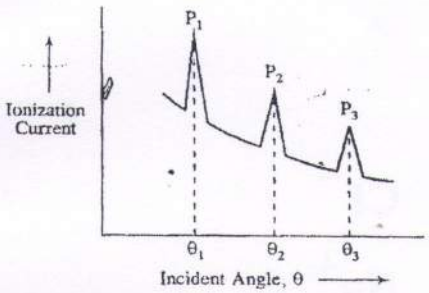



**Face center**: It has points at the corner positions and at the center of 6 faces.



narrow beam of X-ray is allowed to fall on the crystal C, kept on a circular table. The position of the table can be read from the vernier scale $V_1$. The X-ray beam after diffraction enters into the detector which consists of an ionization chamber and a sensitive galvanometer. The detector is kept in an arm which is coupled to the circular table in such a way that as the table is turned through an angle $\theta$, the arm turns through $2\theta$. This is to receive the rays scattered from the crystal. The galvanometer measures the ionization current. When the rays scattered from the crystal interfere constructively, then ionization current increases. This can happen if and only if Bragg's law is obeyed.

The crystal table is rotated till the crystal received the X-ray beam at an angle of incidence satisfying Bragg's law. This is indicated by the sudden increase in ionization current. This occurs more than once as $\theta$ is varied because the law is satisfied for various values of n.




VARIATION OF IONIZATION CURRENT



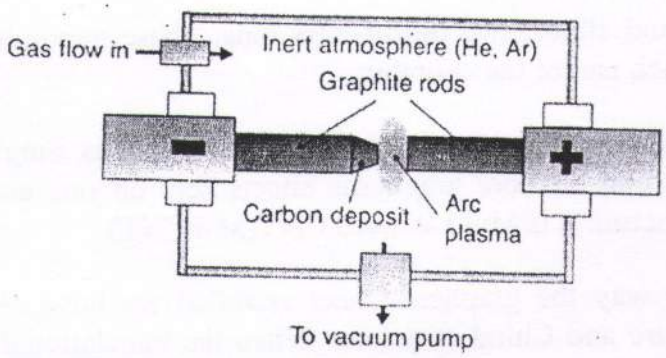
Using Bragg's law we can write, $2dsin\theta_1 : 2dsin\theta_2 : 2dsin\theta_3 = \lambda : 2\lambda : 3\lambda$

$$\theta_1 : \theta_2 : \theta_3 = 1 : 2 : 3$$

We can measure the value of 'd', by measuring $\theta$ provided $\lambda$ & n values are known. Taking Nacl crystal as the specimen, whose value of 'd' is taken from molecular data. $\theta$ corresponding 'n' value are measured from the experiment. From that the value of $\lambda$ is calculated. The Nacl is replaced by the crystal whose 'd' value has to be measured. Using same $\lambda$, value of $\theta$ & n are experimentally determined using $2dsin\theta = n\lambda$ value of 'd' is calculated.

**Uses** :

1. X-rays are used to detect defects in moulded materials.
2. Used in the study of structure of alloys.
3. To study crystal structure.




Using this method large quantity of CNT can be prepared. But SWCNT formed are not pure. They are always associated with impurities (reminants of catalyst, other carbon phases)