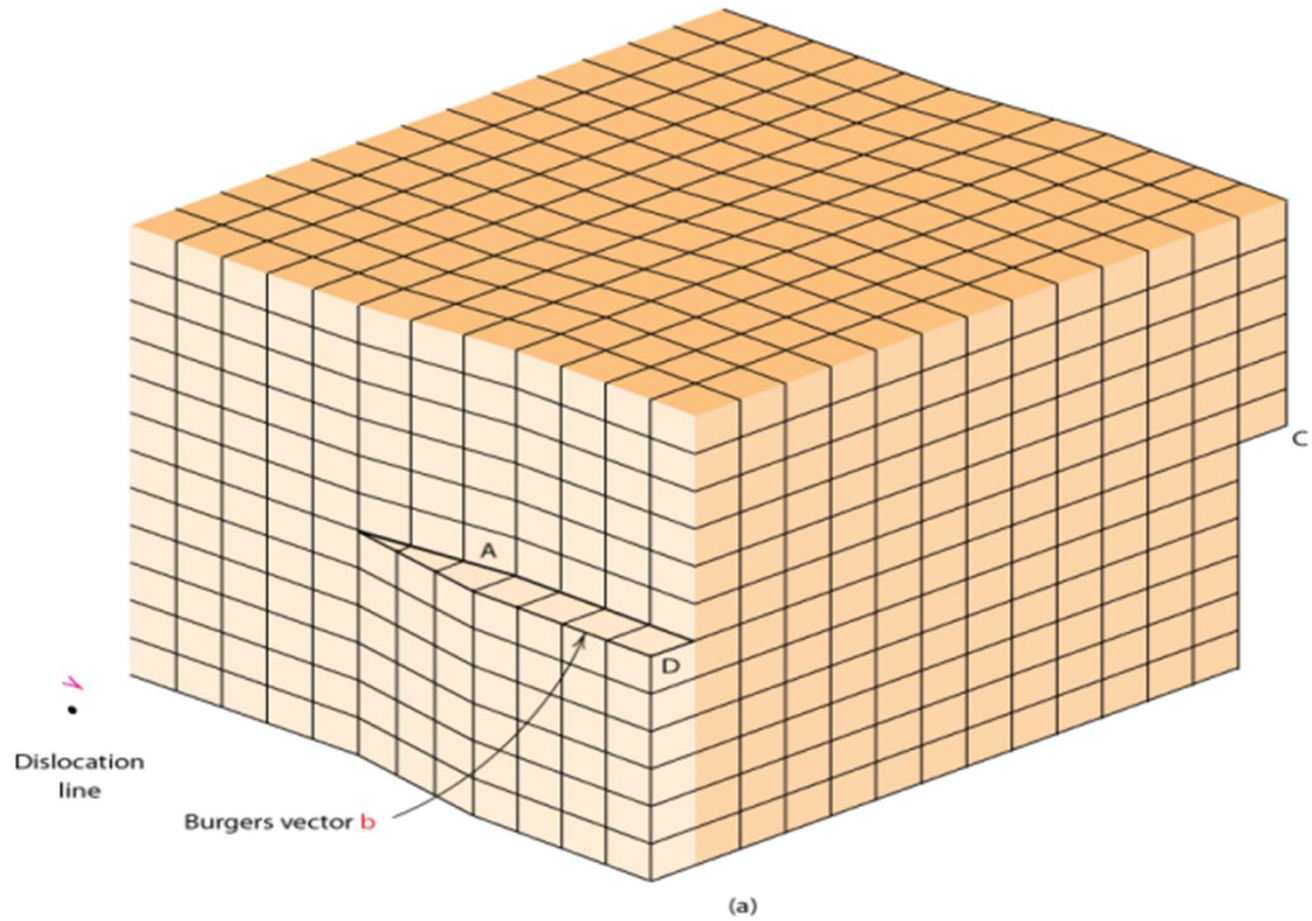


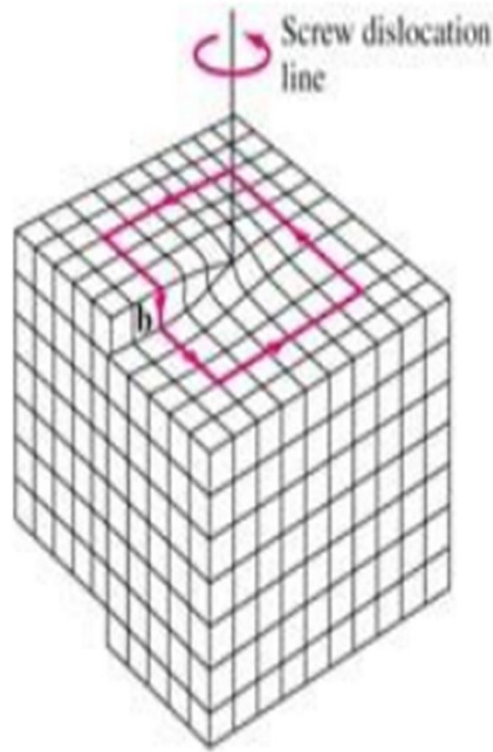
Berger vector is parallel to dislocation line.



Linear/Line Defects – (Dislocations)

- ▶ Line imperfection or dislocation are defects that cause lattice distortions.
- ▶ Dislocation are created during:
 - ▶ Solidification
 - ▶ Permanent deformation of crystalline solid
 - ▶ Vacancy condensation
 - ▶ Atomic mismatch in solid solution
- ▶ Different types of line defects are:
 - ▶ Edge dislocation
 - ▶ Screw dislocation
 - ▶ Mixed dislocation

These shear stresses introduce a region of distorted crystal lattice in the form of a spiral ramp of distorted atoms or screw dislocation



3. Planar or Surface defects

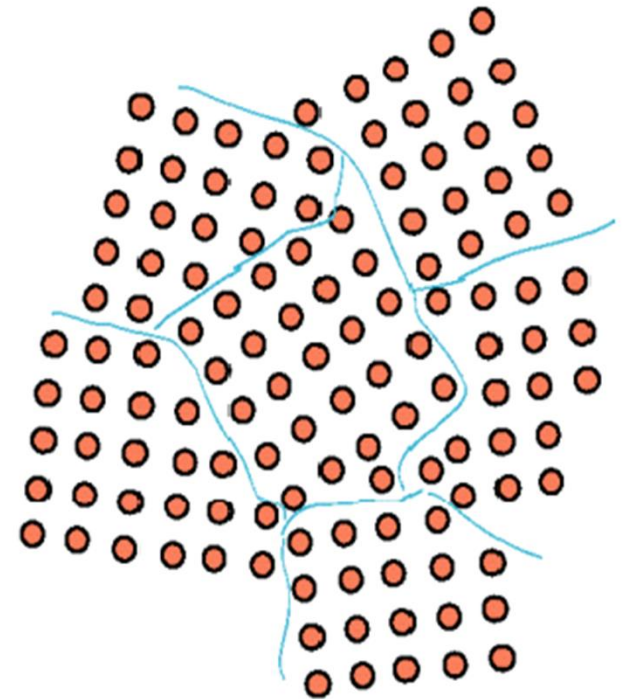
(Two dimensional)

- Planar defects arise due to change in the stacking of atomic planes during mechanical and thermal treatments. The change may be of the orientation or of the stacking sequence of the planes.

- Planar defects are of following types:
 - A. *Grain boundaries*
 - B. *Tilt boundaries*
 - C. *Twin boundaries*

A) Grain Boundaries

- ▶ A Grain Boundary is a general planar defect that separates regions of different crystalline orientation (i.e. *grains*) within a polycrystalline solid . Grain boundaries are usually the result of uneven growth when the solid is crystallizing.



B) Tilt Boundaries

- When the angle between two crystals is less than 10° , the distortion is not so drastic as to be compared with a non crystalline material. They are also called low angle boundaries.
- It can be described as set of parallel, equally spaced edge dislocation of same sign located one above other.
- A Tilt Boundary, between two slightly mis-aligned grains appears as an array of edge dislocations.

