Answer on Question #51556, Physics, Solid State Physics

Explain the three types of defects in crystals.

Answer:

1. Point Defects

Point defects are where an atom is missing or is in an irregular place in the lattice structure (see Fig.1).

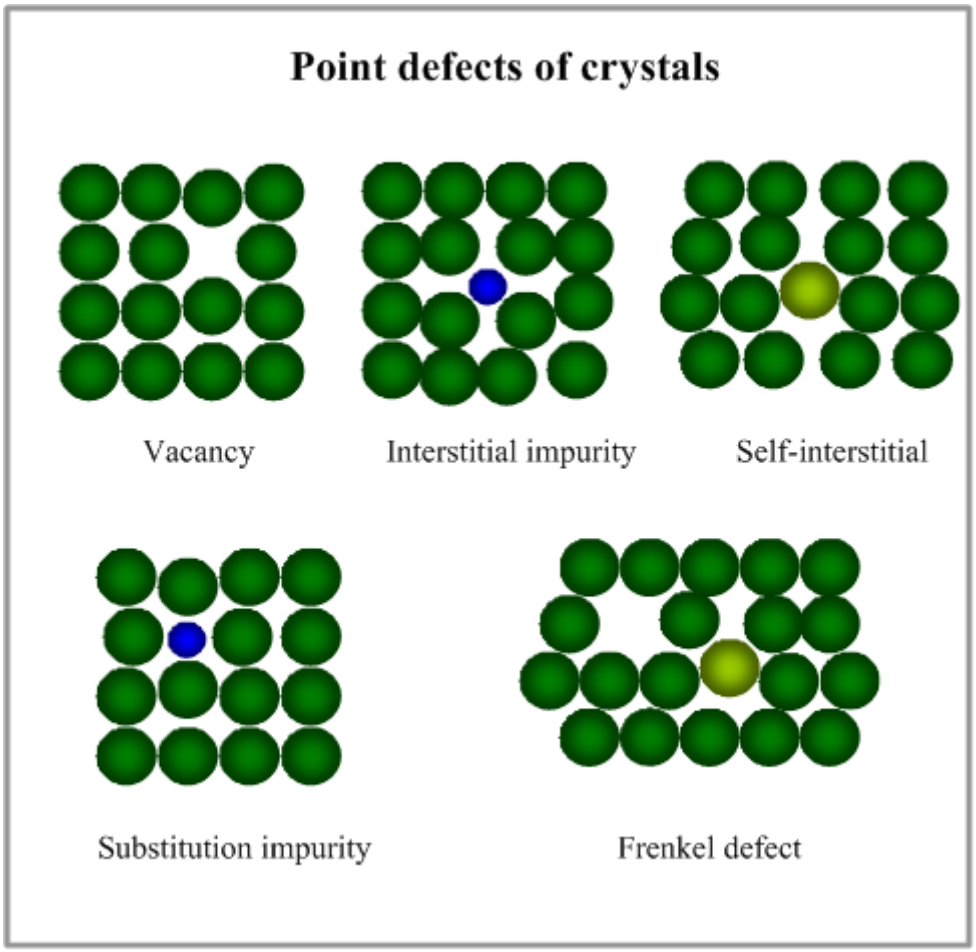

Fig.1

Point defects include self interstitial atoms, interstitial impurity atoms, substitutional atoms and vacancies. A self interstitial atom is an extra atom that has crowded its way into an interstitial void in the crystal structure. Self interstitial atoms occur only in low concentrations in metals because they distort and highly stress the tightly packed lattice structure.

2. Linear Defects

Dislocations are another type of defect in crystals. Dislocations are areas were the atoms are out of position in the crystal structure. Dislocations are generated and move

when a stress is applied. The motion of dislocations allows slip – plastic deformation to occur.

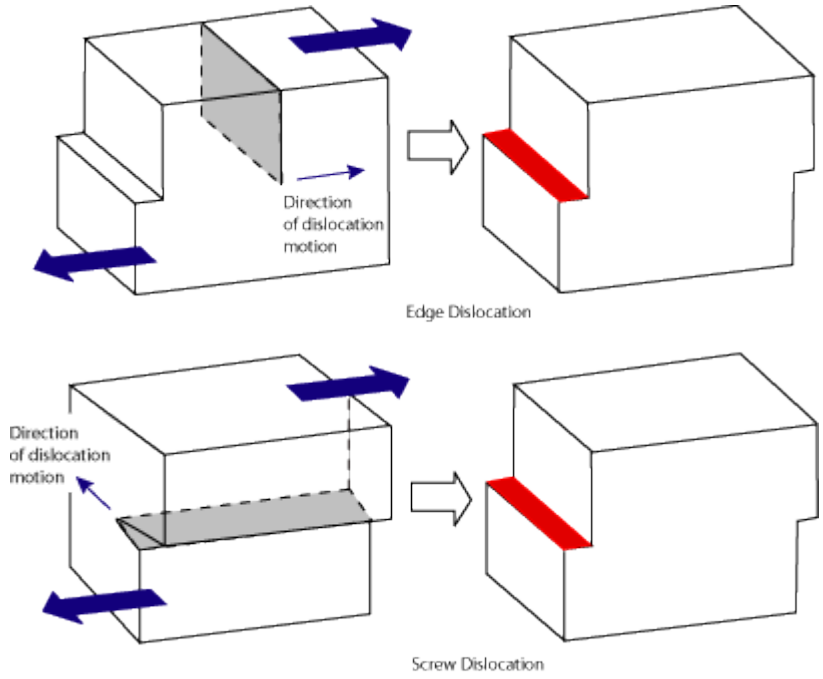

Fig.2

3. Planar Defects

A disruption of the long-range stacking sequence can produce two other common types of crystal defects: 1) a stacking fault and 2) a twin region. A change in the stacking sequence over a few atomic spacings produces a stacking fault whereas a change over many atomic spacings produces a twin region.