

# Recrystallization

Is a laboratory technique for purifying solids or it is a procedure for purifying an impure compound using a solvent.

The method of purification is based on the principle that the solubility of most solids increases with increased temperature .The crude impure solid is dissolved in hot solvent. Solids tend to be more soluble in hot solvents than in cold solvents . During recrystallization, an impure solid compound is dissolved in a hot solvent until the solution becomes saturated , and then the solution cools down. The compound should then form pure crystals. Impurities in the solution will remain and will not be incorporated into the growing crystals. The crystals can then be separated from the solution by filtration. Not all of the compound is separated, some will remain in the solution and will be lost .

Although the terms (Crystallization) and (Recrystallization) are sometimes used interchangeably, they technically refer to different processes. Crystallization refers to the formation of a new, insoluble product by a chemical reaction; this product then precipitates out of the reaction solution as an amorphous solid containing many trapped impurities. Recrystallization does not involve a chemical reaction, the crude product is simply dissolved into solution, and then the conditions are changed to allow crystals to re-form.

### **The Properties of solvent used in recrystallization ?**

1. The substance must be dissolved to be purified in solvent at its boiling temperature and precipitates in the form of crystals by cooling.
2. Finding a solvent will not react with the solute.
3. Finding a solvent that is nonflammable, inexpensive and volatile.
4. The impurities do not dissolve in the solvent.

5. It has a low boiling point so it is easy to remove it from pure compound crystals.

- Dissolving the solute involves adding a small volume of hot solvent. If too much solvent is added, the solution will not be saturated and it does not form crystals.
- Activated Carbon (Charcoal): If the solution is colored, the colored impurities will be absorbed on the surface of the activated carbon, thereby the solution will be rid of these impurities.

## **Recrystallization Process**

- 1 – Preparation of solution of the impure sample.
- 2 – Filtration of the hot solution.
- 3 – Cooling of the hot saturated solution.
- 4 – Separation and drying of crystals.