

Crystallization

Aim: To obtain pure crystals of copper sulphate from an impure sample.

Apparatus: Pestle and mortar, beaker, evaporating dish, sand bath and filter papers.

Chemicals: Impure sample of copper sulphate.

Theory:

Crystallization is the (natural or artificial) process of formation of solid crystals precipitating from a solution, melt or more rarely deposited directly from a gas. Crystallization is also a chemical solid–liquid separation technique, in which mass transfer of a solute from the liquid solution to a pure solid crystalline phase occurs. In chemical engineering crystallization occurs in a crystallizer. Crystallization is therefore an aspect of precipitation, obtained through a variation of the solubility conditions of the solute in the solvent, as compared to precipitation due to chemical reaction.

Procedure:

- (i) Grind some of the impure sample of copper sulphate in a pestle and weigh out roughly 5 g. Take 50 ml of distilled water in a beaker and add the weighed sample of impure copper sulphate. Warm gently and stir it with a glass rod. The copper sulphate will dissolve leaving the insoluble impurities in suspension. Filter the solution into an evaporating dish.
- (ii) Heat the solution gently on a sand bath and concentrate it to the saturation point. Test the attainment of the saturation point. If it has been reached, stop heating the solution and keep it aside for crystallization.
- (iii) After some time the crystals will appear. Remove the mother liquor by decantation and wash the crystals to remove the mother liquor sticking to the crystals. Dry the crystals by pressing them between filter papers.

Result :

- i. Colour of the crystals: _____
- ii. Shape: _____
- iii. Yield: _____ Grams
- iv. Percentage yield: _____ %

Diagram :

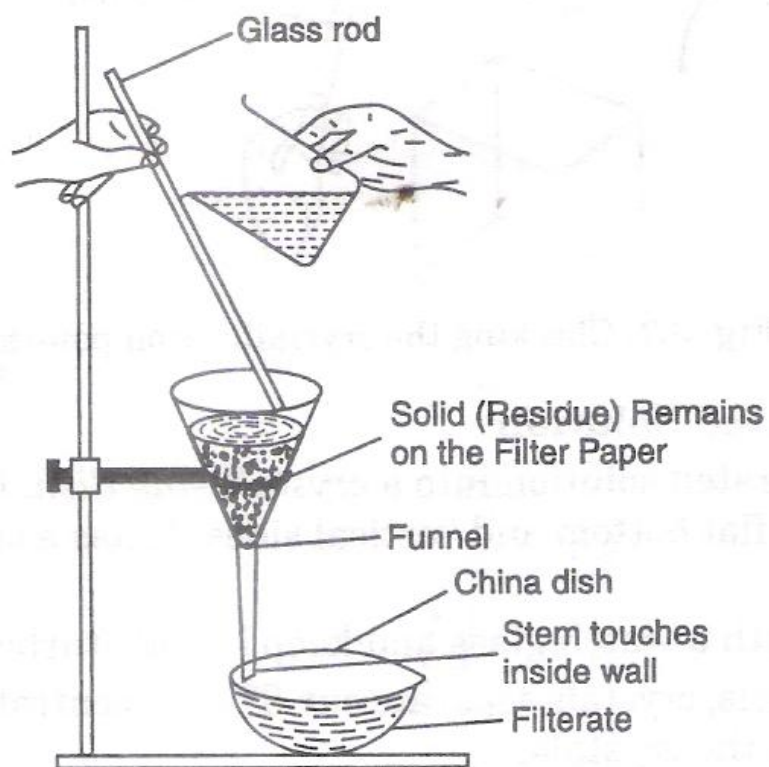


Fig. Removing insoluble impurities by filtration.

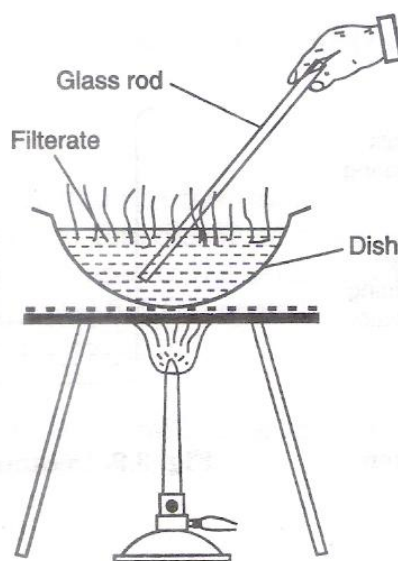


Fig. Evaporation of solution.