Laboratory of Organic chemistry

1st stage

2022-2023

Experiment No. (3):

Recrystallization

Purpose of Experiment:

- To separate organic compounds (solid) from impurities by recrystallization (purification of solid organic compounds).

Recrystallization is an important technique for purifying solid organic compounds consists in dissolving it in a suitable solvent at the boiling point, filtering the hot solution by gravity to remove any suspended insoluble particles and letting crystallization proceed.
This technique is based on the fact that both the solid and impurities may dissolve in given solvent, but not to the same extent.

The most important factors affecting the recrystallization:

a) Choosing a good solvent.
b) Using the right amount of solvent.

Characteristics of suitable solvent:

1. It should not react chemically with the substance to be purified.
2. Dissolves only the organic compound at its boiling point, leaving the impurities.
3. In a minimum volume dissolves the organic compound.
4. The solvent should be volatile (easily separated by evaporation).
5. Available, inexpensive and non-inflammable.

- In selecting a solvent consider that polar solvents dissolve polar compounds and non-polar solvents dissolve non-polar compounds.

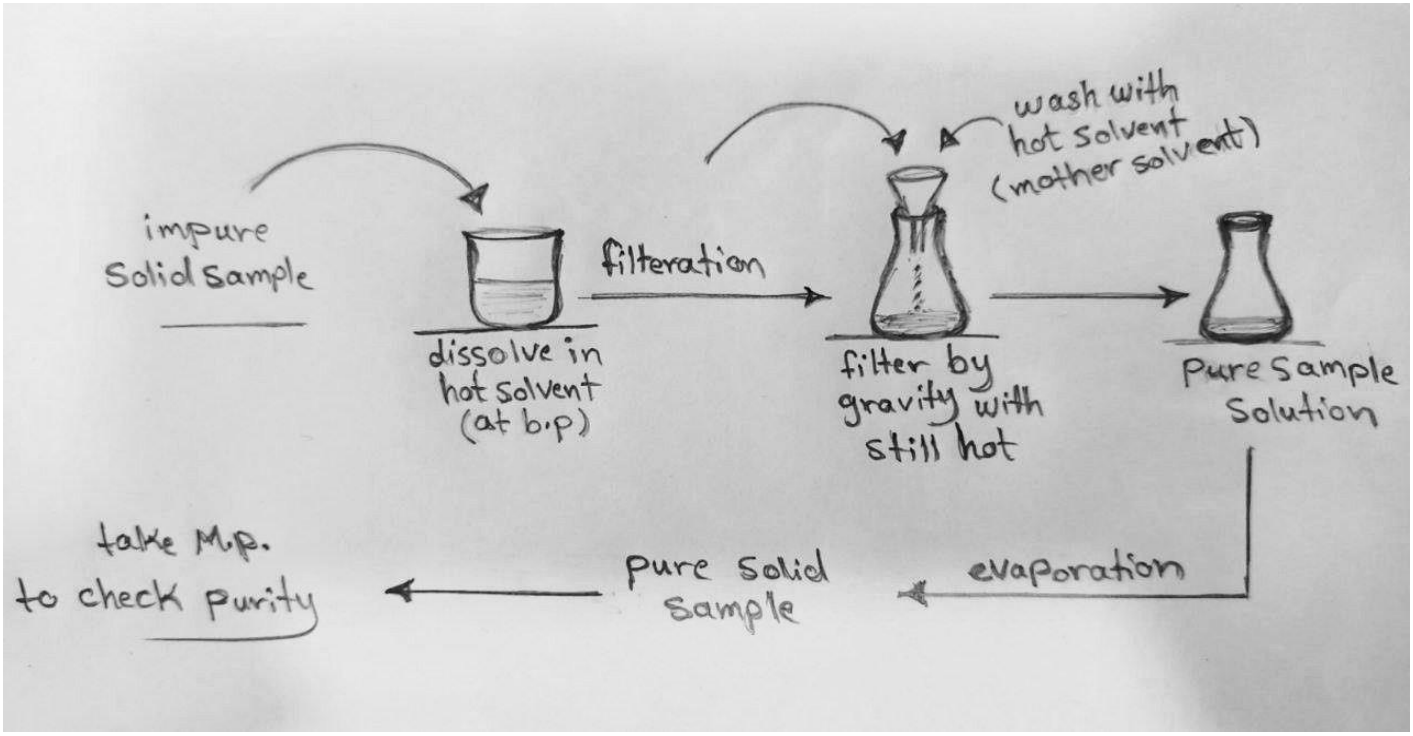
The most commonly used recrystallization solvents are presented in the following table:

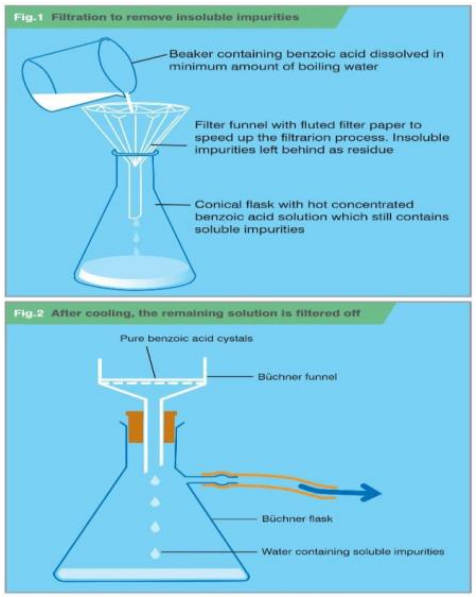
Solvent	Formula	polarity	Boiling point(^{o}c)
water	H_2O	Very polar	100
Ethanol	CH_3CH_2OH	Polar	78
Methanol	CH_3OH	Polar	65
Dichloromethane	CH_2Cl_2	Slightly polar	40
Diethyl ether	$(CH_3CH_2)_2O$	Slightly polar	35

Procedure

1. Dissolve (1gm) of substance (benzoic acid) with (30ml) solvent (distilled water) in beaker, heats the mixture at temperature near of the boiling point, and stir with stirring rod.
2. Filter the hot mixture through filter paper.
3. Wash the filter paper with hot solvent (mother solvent).
4. Cool the mixture to room temperature and dry the crystals.
5. Weight the crystals (pure benzoic acid).
6. Calculate the percent recovered using the following formula and determine the melting point of your recrystallized benzoic acid.

$$\%\ \boldsymbol{Recovered} = \frac{\boldsymbol{Weight\ of\ benzoic\ acid\ obtained\ after\ recrystallizationn}}{\boldsymbol{Weight\ of\ benzoic\ acid\ before\ recrystallization}} \times \mathbf{100}$$





Lecturer
Jumana N. Al-Hajeri