

Some Analytical Techniques

purifying and separating what a mixture is hiding

Filtration and Crystallisation

- insoluble impurity removed by filtration: residue stays on the paper, filtrate passes through
- suction filtration: Buchner funnel plus vacuum pump, faster, used for hot filtration
- a **safety bottle** sits between flask and pump, keeps filtrate out
- crystallisation: dissolve near-saturated hot, filter hot, cool to crystallise, filter again for pure crystals
- the leftover filtrate after crystallisation is the **mother liquor**
- a good solvent dissolves little cold, plenty hot
- it must not react with the compound, and is volatile enough to remove
- the usual solvents: water, ethyl or methyl alcohol, acetone, ether
- copper sulphate, benzoic acid and common salt** are all crystallised from water
- purification exploits a difference in physical properties, e.g. filtration exploits solubility
- the everyday version: tea leaves out of a decoction, sand out of sandy water



crystals settled at the bottom of the beaker under the cooled mother liquor, the solid the second filtration collects

A Good Crystallisation Solvent

Cold vs hot

little dissolves cold, plenty dissolves hot

Unreactive

does not react with the compound

Volatile

removed easily afterward

Dissolve hot

a near-saturated solution

→ then

Filter hot

insoluble impurities stay behind

→ then

Cool

solute crystallises, soluble impurities stay dissolved

→ then

Filter again

pure crystals, free of both impurities