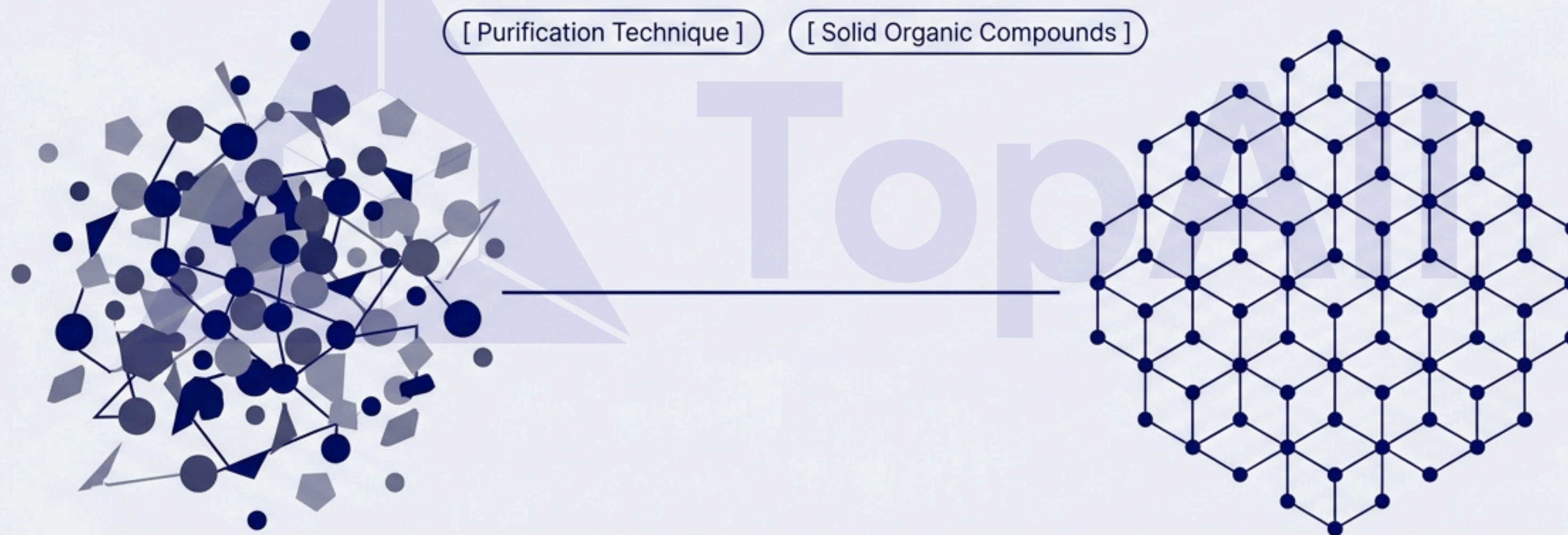


Crystallisation

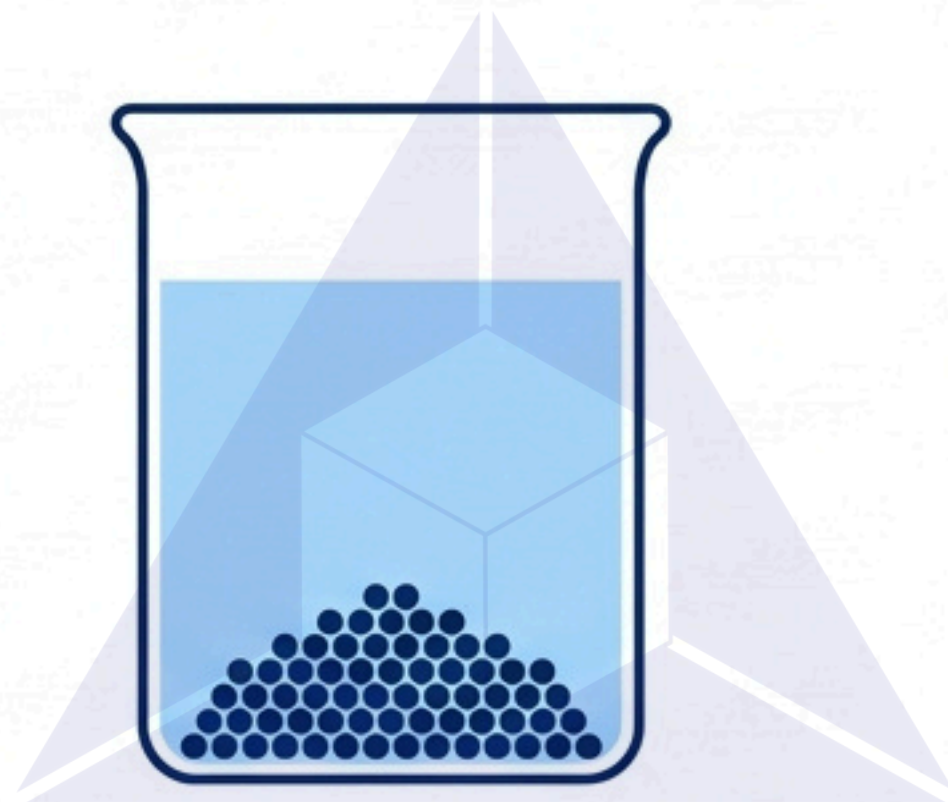
The Blueprint for Purifying Solid Organic Compounds.



The most commonly used laboratory technique to isolate pure solid organic compounds from impurities.

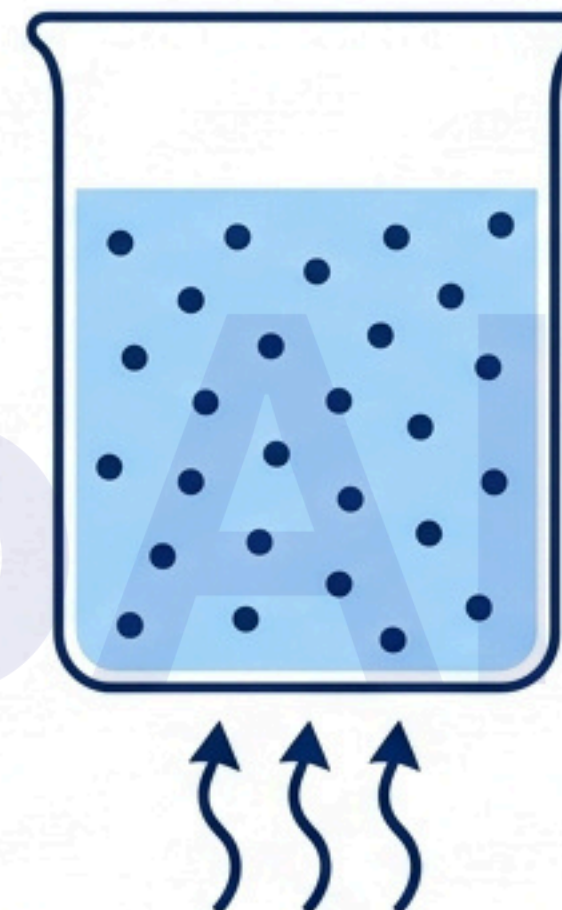
The Core Principle: Differential Solubility

Room Temperature



The target compound must be **sparsingly soluble**. The solid remains largely undissolved in the solvent.

Hot Solvent

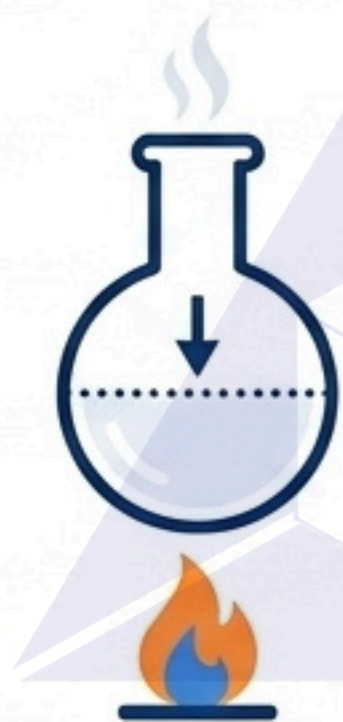


The target compound must be **appreciably soluble**. Heat increases kinetic energy, allowing the compound to fully dissolve.

The entire technique relies on exploiting this specific difference in solubility between the compound and its impurities.

The Crystallisation Mechanism

01. Concentration



The impure compound is dissolved in the hot solvent. The solution is then concentrated by boiling off excess solvent to create a **nearly saturated solution**.

02. Cooling



The hot, saturated solution is removed from heat. As it cools gradually, the solvent's capacity to hold the compound drops.

03. Crystal Formation



Pure compound crystallises out of the solution due to decreased solubility, leaving impurities behind. The crystals are isolated via filtration.



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$$E=mc^2$$



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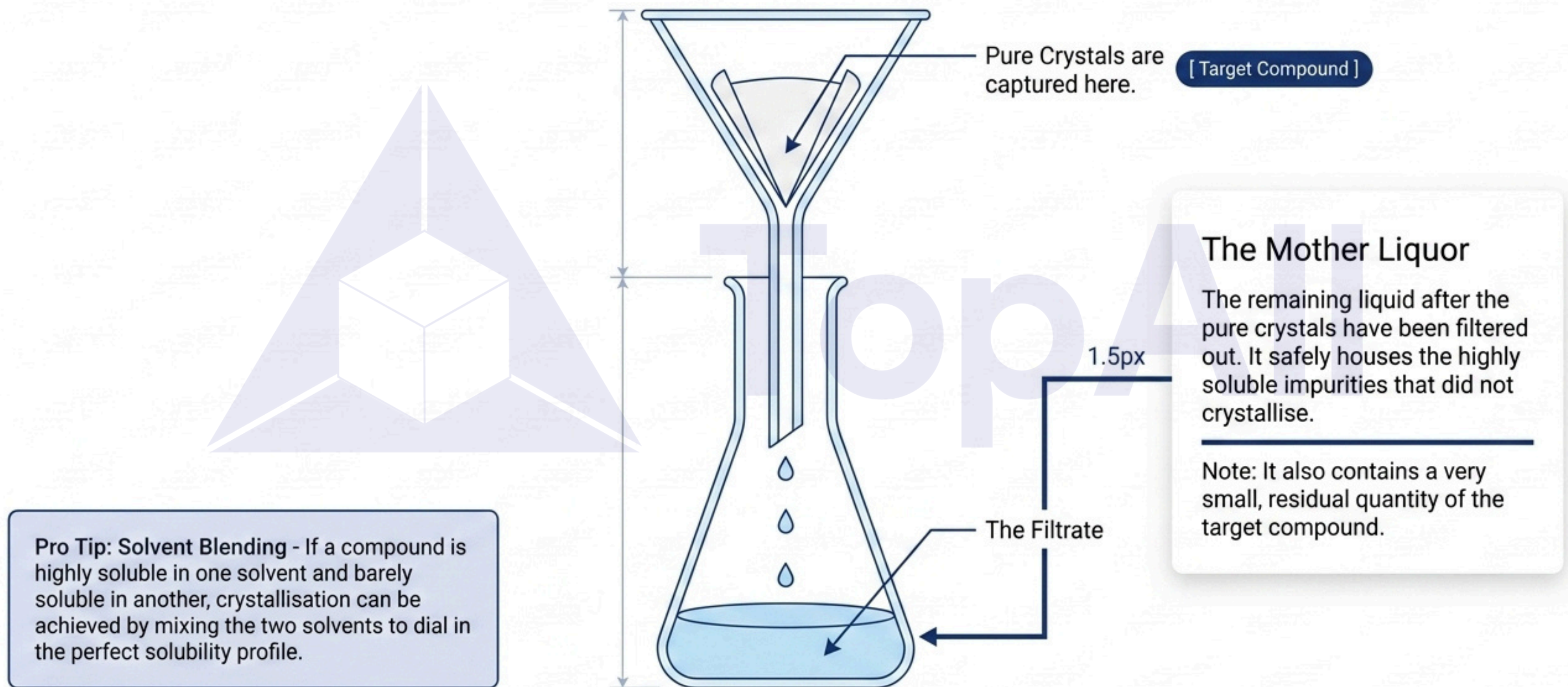
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Key Highlights

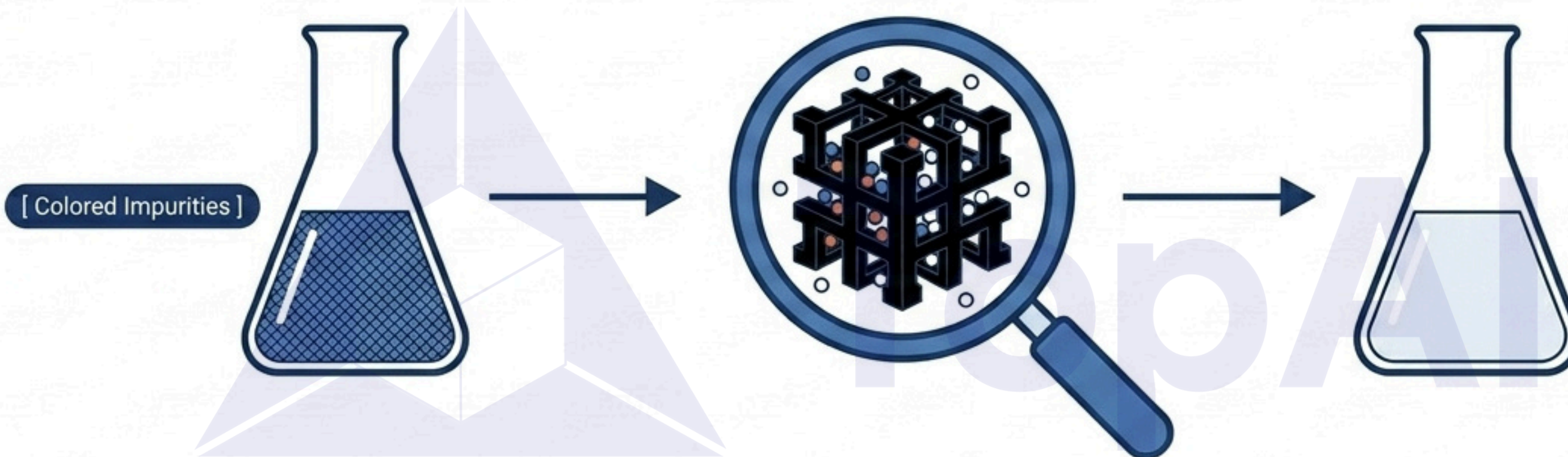
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Demystifying the Mother Liquor



The Edge Case: Colored Impurities



The Problem

Some impurities impart unwanted color to the solution, which won't be removed by standard cooling.

The Solution

Introduce **activated charcoal** during the hot filtration stage.

The Mechanism

Charcoal acts as an adsorbent. The colored impurities stick to its porous surface, while the target compound solution passes through cleanly.

Key Takeaways: Crystallisation Mastery



[01. The Principle]

Relies entirely on the difference in solubilities between the target compound and its impurities in a specific solvent.

[02. The Temperature Rule]

The ideal solvent must render the compound **sparingly soluble** at room temperature, but **appreciably soluble** when hot.

[03. The Mother Liquor]

The filtrate remaining after crystal extraction. It holds the highly soluble impurities and trace amounts of the target compound.

[04. Activated Charcoal]

Used as an adsorbent during hot filtration to actively strip away unwanted colored impurities from the solution.

Mastery of these four principles ensures accurate execution and exam readiness.



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