

Solubility Test

Question 1: Based on the experiment, describe the **solubility of benzoic acid in cold toluene**. **Suggest the polarity** of benzoic acid.

Question 2: Why is the reaction mixture agitated in a **hot water bath**?

Question 3: If **toluene is changed to ethanol**, what would you observe on the **solubility** of both solvents? Provide justification for your answer.

Question 4: How to **recover dissolved benzoic acid** from the experiment? Explain and justify the method briefly.

Question 5: Can you suggest the **continuity of the experiment** in order to collect the purified benzoic acid crystals?

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Answer 1: Benzoic acid **dissolves partially in cold toluene**. This indicates that benzoic acid is a **polar compound** since it only dissolves partially in toluene, a non-polar solvent.

Answer 2: The reaction mixture is agitated in a hot water bath to **increase the solubility** of benzoic acid in toluene.

Answer 3: Benzoic acid will **dissolve in ethanol since ethanol is a polar solvent**. As the solubility rule says '**like dissolve like**', polar solutes dissolve in polar solvents and non polar solutes dissolve in non polar solvents.

Answer 4: Dissolved benzoic acid can be recovered through **recrystallization**. This is done by running the reaction mixture under cold water to **decrease the solubility** of benzoic acid in toluene and **allow it to crystallize**.

Answer 5: The benzoic acid crystals can be collected through **filtration and allowed to dry in oven**.

