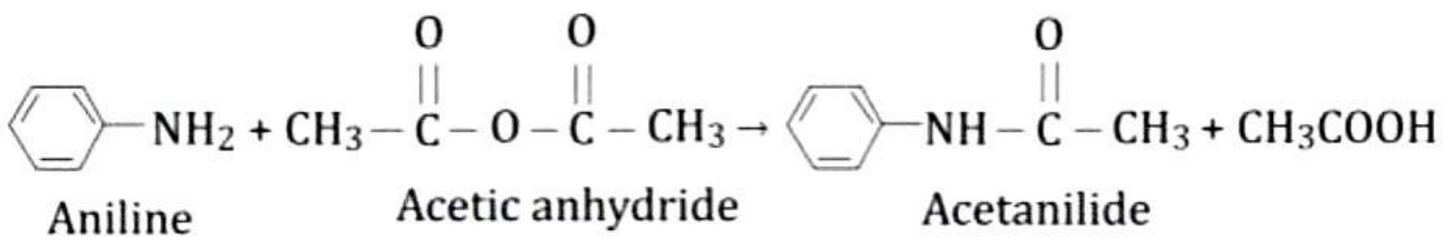
EXPERIMENT

Aim

To prepare a sample of acetanilide from aniline.

Theory

Acetanilide is prepared by acetylating aniline with acetic anhydride in the presence of glacial acetic acid. The chemical equation can be written as:



Material Required

Round bottom flask (100 ml), water condenser, wire-gauze, tripod stand, burner, iron-stand, clamp, measuring cylinder, etc.

Aniline = 5 ml

Acetic anhydride = 5 ml

Glacial acetic acid = 5 ml.

Procedure

1. Take 5 ml of acetic anhydride in a clean dry 100 ml conical flask and add 5 ml of glacial acetic acid and shake the contents thoroughly.
2. Take this mixture in the flask, add 5 ml of aniline and fit a water condenser.
3. Place the flask on a wire-gauze placed on a tripod stand as shown in Fig.1.
4. Boil the mixture for 10-15 minutes.
5. Allow the mixture to cool. Detach the condenser and pour the liquid into 150 ml ice-cold water contained in a beaker. During addition, stir vigorously the contents of the beaker with the help of glass-rod.
6. Filter the white precipitates which separate out and wash with cold water.
7. Recrystallize from hot water containing a few drops of ethyl alcohol. Weigh the crystals and record the yield.
8. Determine the melting point of the compound.

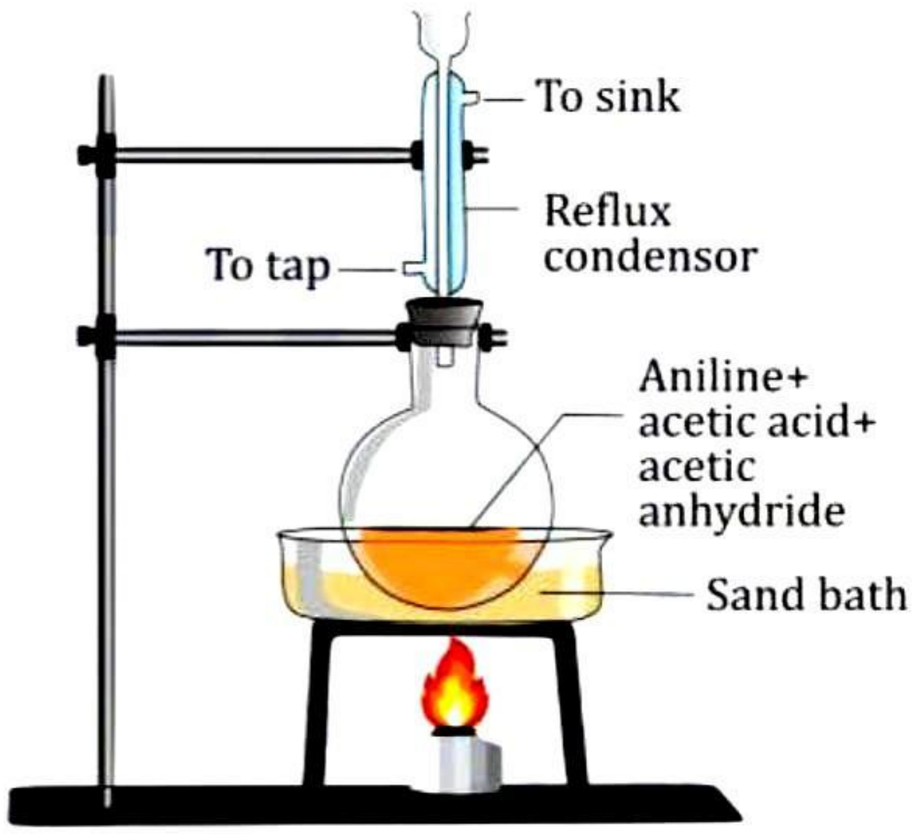


Fig 1 Preparation of acetanilide

Result

Weight of acetanilide obtained =.....g

Melting point of acetanilide = ... °C

Note: Acetanilide has white flaky crystals. Its melting point is 113°C.

Precautions

1. Freshly distilled aniline should be used in order to get good results, or a small amount of zinc can be added in the reaction mixture. Zinc reduces the coloured impurities in the aniline and also prevents its oxidation during the reaction.
2. Prolonged heating and use of excess acetic anhydride should be avoided.
3. Reaction mixture should first be cooled and then poured in ice-cold water otherwise hydrolysis of acetanilide may take place.

VIVA VOCE

Q 1. Why is aniline acetylated to form acetanilide?

Ans. Acetylation improves the properties of aniline, making it less toxic and enhancing its stability.

Q 2. Explain the reaction involved in the preparation of acetanilide from aniline.

Ans. The reaction involves acetylation, where aniline reacts with acetic anhydride to form acetanilide, with the elimination of water.

Q 3. What is the role of acetic anhydride in this reaction?

Ans. Acetic anhydride serves as the acetylating agent, providing the acetyl group for the reaction with aniline.

Q 4. Discuss the significance of using glacial acetic acid in the preparation.

Ans. Glacial acetic acid is used as a catalyst to facilitate the acetylation reaction.

Q 5. What safety precautions should be taken during the preparation of acetanilide?

Ans. Safety precautions may include wearing protective equipment, working in a well-ventilated area, and avoiding skin contact.

Q 6. How would you separate and purify the acetanilide product from the reaction mixture?

Ans. Techniques such as recrystallization can be employed for separation and purification.