Chapter:
19

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AIM: TO CARRY OUT THE SYNTHESIS OF BENZALDEHYDE PHENYL HYDRAZONE FROM BENZALDEHYDE AND PHENYL HYDRAZINE

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Requirements

Chemicals

1. Phenylhydrazine reagent
2. ethanol
3. sulphuric acid
4. water
5. benzaldehyde

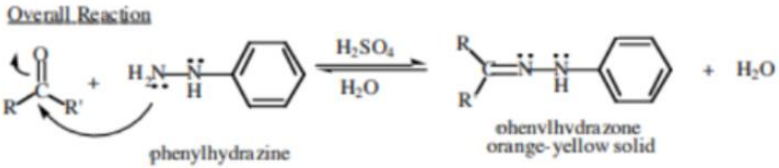
Apparatus

1. Conical flask
2. RBF
3. Condenser
4. Beaker

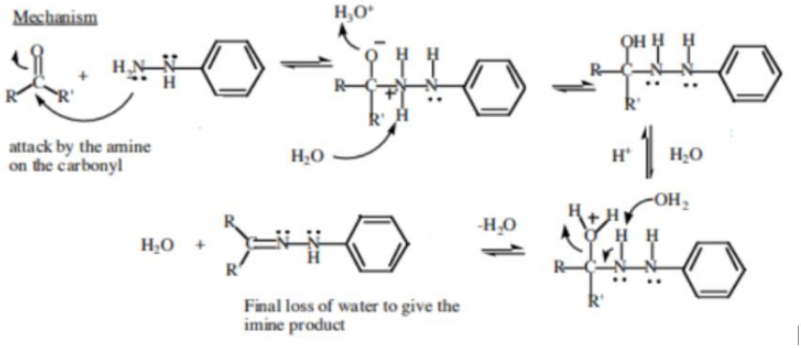
Theory

Hydrazone formation is a type of condensation reaction between hydrazine and carbonyl compounds with the liberation of water molecule. Reaction afforded respective products with excellent yield in presence of acid catalyst.

Reaction



Mechanism



Initially, nucleophilic nitrogen of phenylhydrazine attacks on electrophilic centre of carbonyl compound to produce an addition intermediate. Addition intermediate affords the final hydrazine product after the elimination of water molecule. Thus, product formation follows the nucleophilic addition-elimination mechanism.

Physical properties

Benzaldehyde

- Benzaldehyde has significant solubility in ethanol and diethyl ether and limited aqueous solubility.
- Benzaldehyde is sharp smelled liquid.

Phenyl hydrazine

- Phenylhydrazine has good solubility in organic solvents
- Phenylhydrazine is sparingly soluble in aqueous medium.

Benzaldehyde Phenyl Hydrazone

1. Melting point is 156°C

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2. Refractive index-1.5014
3. Boiling point is 323.14°C
4. Density-1.1265
5. Storage temperature- Keep in dark place at room temperature

Chemical properties

Benzaldehyde

- It has –CHO functional group and aromatic.
- It has reducing property.
- It behaves as an electrophile and can react with nucleophilic substances.

Phenyl hydrazine

1. Phenylhydrazine can be synthesized from aniline using diazotization followed by reduction approach.
2. Phenylhydrazine is sensitive to environmental air and oxidized upon exposure.

Benzaldehyde phenyl hydrazone

1. Aldehydes react with phenylhydrazines to form corresponding phenyl hydrazones.
2. Benzaldehyde phenyl hydrazone compound exist in canonical forms.
3. Benzaldehyde phenyl hydrazones were studied using spectro-photometric methods.

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Procedure

1. Add 5gm of phenylhydrazine and 5ml. of Benzaldehyde in a round bottom flask and stir the reaction mixture for 30minutes. Product will be crystallizing after completion of the reaction.
2. Filter the crude product using vacuum and wash with cold water for 3-4 times.
3. Dry the product and purify using recrystallization with cold ethanol.
4. Again dry the crystalline product and record the melting point using capillary and melting point appratus.
5. Weigh the pure product and calculate percentage yield.

Applications

1. It is used in various organic transformations.
2. It is used to synthesize various intermediates for dyes and pharmaceuticals.
3. Phenylhydrazine is employed for hydrazine formation by reacting with carbonyl compounds.
4. Benzaldehyde is categorized as a bee repellent.

Result: Benzaldehyde phenyl hydrazone was successfully synthesized and found its percentage yield=……..%.

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