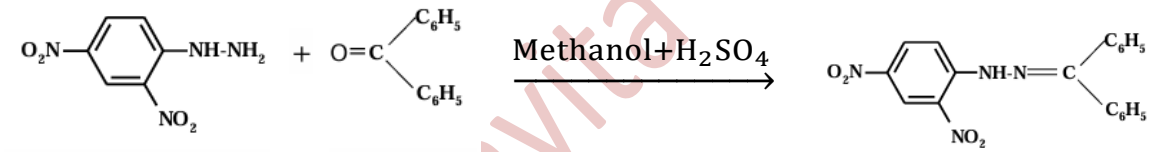
EXPERIMENT 2

AIM: Preparation of 2,4-dinitrophenylhydrazone derivative from Benzophenone

Theory:

2,4-Dinitrophenylhydrazine (2,4-DNP) reacts with ketones and aldehydes, and is used to distinguish these functional groups from other carbonyl compounds, such as esters, which do not react. The formation of a red or orange precipitate (a 2,4-dinitrophenylhydrazone) constitutes a positive test. Aldehydes and ketones react with 2,4-DNP (a solid) reagent to form yellow, orange, or reddish-orange precipitates, whereas alcohols do not react. If the carbonyl compound aromatic then the precipitate will be red. Formation of a precipitate therefore indicates the presence of an aldehyde or ketone. The precipitate from this test also serves as a solid derivative.

2,4 DNP reagent is much more reactive than phenyl hydrazine towards aldehydes and ketones. Both aldehydes and ketones contain a carbonyl group (-CO-) of low reactivity often readily react with 2,4 DNP reagent to give a 2,4- dinitro-phenyl hydrazone derivative.



2,4-Dinitro phenyl hydrazine + Benzophenone → Benzophenone-2,4-Dinitro phenyl hydrazone

Requirements:

2,4-DNP, Methanol (CH_3OH), Conc. H_2SO_4, benzophenone, 100 ml beaker, measuring cylinder, funnel, a glass rod, filter paper.

Procedure:

1. Dissolve 1g of 2,4-DNP in 25 ml of methanol in a 100 ml beaker.
2. Add 1.5 ml of conc. H_2SO_4 cautiously down the wall of the beaker (beaker 1)
3. Stir the content in beaker 1 with a glass rod to dissolve 2,4-DNP.
4. In another beaker, prepare 0.4g of benzophenone dissolved in minimum volume of methanol (beaker 2)
5. Add the solution in beaker 1 into beaker 2 with stirring.
6. If no solid crystals appear within 10 min, then add some conc. H_2SO_4.
7. Filter the solid, wash with methanol, dry and take weight.

Precautions:

1. Take proper safety measures while using methanol.

Result

The crystals of 2,4- dinitro-phenyl hydrazone derivative of benzophenone were obtained.

Yield = 0.90 g