Calculation

* Chlorobutanal (mol. formula ($C_4H_3Cl_3O$) = 177.5 gm
* Chloroform - mol. formula ($CHCl_3$) = 119.5 gm.

$$d = \frac{n}{V} = V = \frac{m}{d} = \frac{11.95}{1.475} = 81.016 \text{ ml}$$

acetone - mol. wte (C_3H_6O) = 58 gm

$$\text{theoretical yeild} = \frac{\text{mol. wt of Product}}{\text{mol. wt of Reactant}} \times \text{wt taken}$$

$$= \frac{177.5}{119.5} \times 7.36 = 20.95 \text{ gm}$$

Practical yeild = 2.5 gm.

$$\text{Percentage of yeild} = \frac{\text{Paractical yeild}}{\text{theoritical yeild}} \times 100$$

$$= \frac{2.5}{20.5} \times 100$$

$$= 9.1\%.$$

Expt. No : 3
Date : 16/9/21

SYNTHESIS OF CHLOROBUTANOL

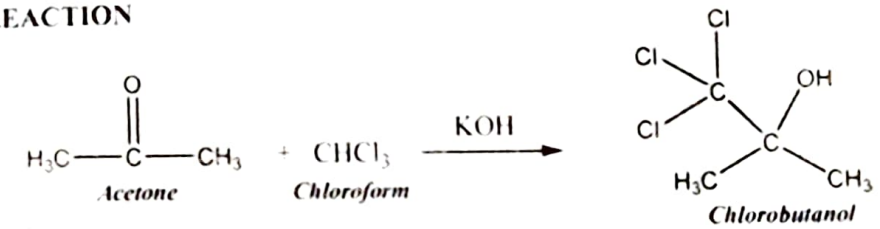
Aim: To synthesize chlorobutanol in the laboratory and characterize the crude and re-crystallized product.

Chemicals required: Acetone, Chloroform and Potassium Hydroxide

Aapparatus required: Measuring cylinder, round bottom flask, beaker, buchner funnel, water bath, vacuum desiccator and glass rod.

Principle: It is formed by the simple Nucleophilic addition of chloroform and acetone chlorobutanol is prepared by the addition of chloroform to acetone under the influence of powdered potassium hydroxide.

REACTION



Procedure:

1. 4.5 ml Acetone, 5 ml chloroform and 1 gram powdered potassium hydroxide was mixed in a 250ml flask, and the reaction mixture was stirred at 5°C for two hours.
2. The resulting suspension was filtered and then distill at 60°C until the weight of the solution remains constant.
3. The yellowish oily residue was mixed with 50 ml of ice-cold water and chlorobutanol precipitated as a white crystalline material, which was filtered off and dried (preferably in a vacuum desiccator).
4. Recrystallize in ethanol to get pure solid chlorobutanol crystals.

Report: Chlorobutanol was synthesized from acetone and the crude, crystallized products are characterized by determining the melting point.

State : Solid
Colour : white
Theoretical yield : 20.95 gm
Practical yield : 2.5 gm
Percentage yield : 9.1 %
Melting point : 84-105°C (98°C)

8/7