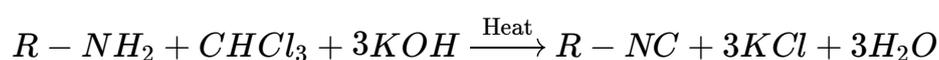




The **Carbylamine Reaction** (also known as the **Hofmann Isocyanide Test**) is a chemical reaction used to detect primary amines. In this reaction, primary amines react with chloroform and alcoholic potassium hydroxide to produce isocyanides (carbylamines), which have a characteristic unpleasant odor.

Reaction:

The general reaction for the carbylamine reaction is as follows:

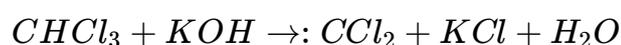


- **R-NH₂**: Primary amine (aliphatic or aromatic).
 - **CHCl₃**: Chloroform.
 - **KOH**: Potassium hydroxide (strong base).
 - **R-NC**: Isocyanide or carbylamine, characterized by its foul smell.
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Mechanism:

1. Formation of Dichlorocarbene:

- Chloroform ($CHCl_3$) reacts with alcoholic potassium hydroxide to generate dichlorocarbene ($:CCl_2$), a reactive intermediate.



2. Reaction with Primary Amine:

- The dichlorocarbene reacts with the primary amine ($R - NH_2$) to form an intermediate.

3. Formation of Isocyanide:

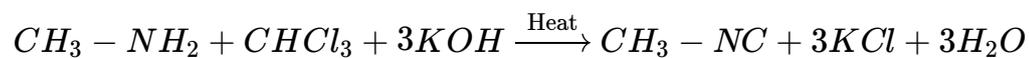
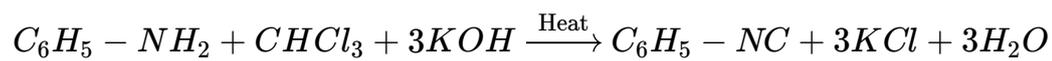
- The intermediate rearranges to form the isocyanide ($R - NC$), which is the final product.
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Key Features:

- The reaction only occurs with **primary amines**; secondary and tertiary amines do not undergo this reaction.
 - The isocyanides formed have a strong, unpleasant odor, making this reaction a qualitative test for the presence of primary amines.
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Applications:

- **Qualitative Analysis**: Used as a diagnostic test to identify primary amines in a sample.
- **Synthetic Applications**: Occasionally used to synthesize isocyanides for further reactions in organic chemistry.

Example:**1. With Methylamine:****2. With Aniline (Aromatic Amine):**

The carbylamine reaction is a useful and specific test for detecting primary amines.