

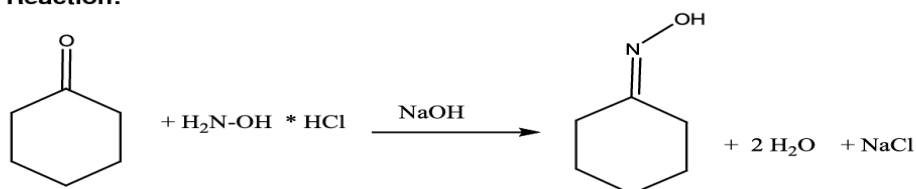
Cyclohexanone oxime notes

Background

The carbonyl functional group has a large dipole. The carbon of the carbonyl carries a partial positive charge, the oxygen carries a partial negative charge. The carbon is susceptible to nucleophilic attack which results in breaking the π bond to oxygen and forming a tetrahedral intermediate. This is usually followed by a series of proton exchanges where the oxygen is converted to a better leaving group, then a new bond is formed from the nucleophile to the carbon and the oxygen leaves. A wide variety of carbonyl derivatives are made by this same general reaction mechanism.

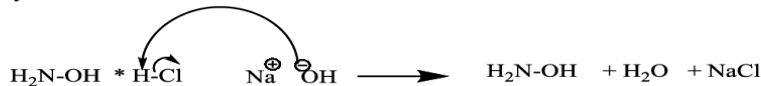
In this experiment a cyclohexanone oxime will be formed from cyclohexanone and hydroxylamine. Cyclohexanone oxime will be synthesized, isolated, recrystallized, and analyzed.

Reaction:



Mechanism:

When $\text{H}_2\text{N-OH} \cdot \text{H-Cl}$ is written, it means that the HCl separates and associates with the other molecule forming a salt $\text{H}_3\text{N}^+\text{-OH} \text{Cl}^-$. This is the form that the hydroxylamine is packaged and sold. First the hydroxylamine hydrochloride is reacted with base to 'free' the material.



Now the hydroxylamine reacts with the carbonyl. The nitrogen is a stronger nucleophile than oxygen.