

Study Notes On Hoffmann Bromamide Degradation Reaction



HOFMANN BROMAMIDE DEGRADATION

Hofmann Bromamide degradation is also known as Hofmann degradation or Hofmann rearrangement. It is different from the Hofmann elimination reaction. This is the organic reaction in which amide is treated with bromine in an aqueous or ethanolic solution of sodium hydroxide to give primary amine.

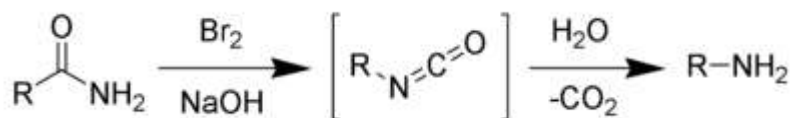
In this reaction, amide is degraded to primary amine. Thus, this reaction is used to form primary Amines. An important characteristic of this reaction is that amine with one carbon less than those present in amide is formed.

This reaction undergoes molecular rearrangement that involves migration of an alkyl or aryl group from the carbonyl carbon to the adjacent nitrogen atom.

In this reaction, halogen is used – Bromine (Br₂) or Chlorine (Cl₂)

The medium used is strongly basic (NaOH or KOH) aqueous medium.

General reaction-



Reaction mechanism-

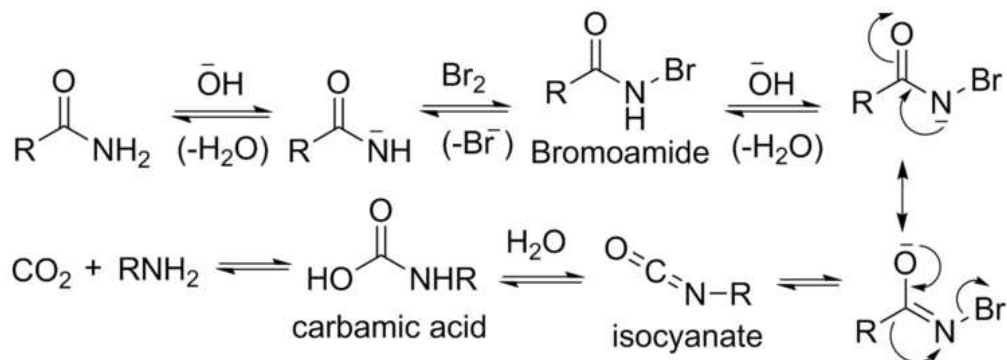
Step 1: Base attacks amide deprotonating it and generating anion.

Step 2: Anion reacts with Br₂ forming bromoamide.

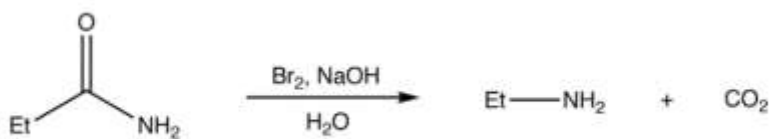
Step 3: Deprotonation of bromoamide occurs forming bromoamide anion which undergoes rearrangement forming isocyanate.

Step 4: Isocyanate forms carbamic acid by addition of H₂O molecules.

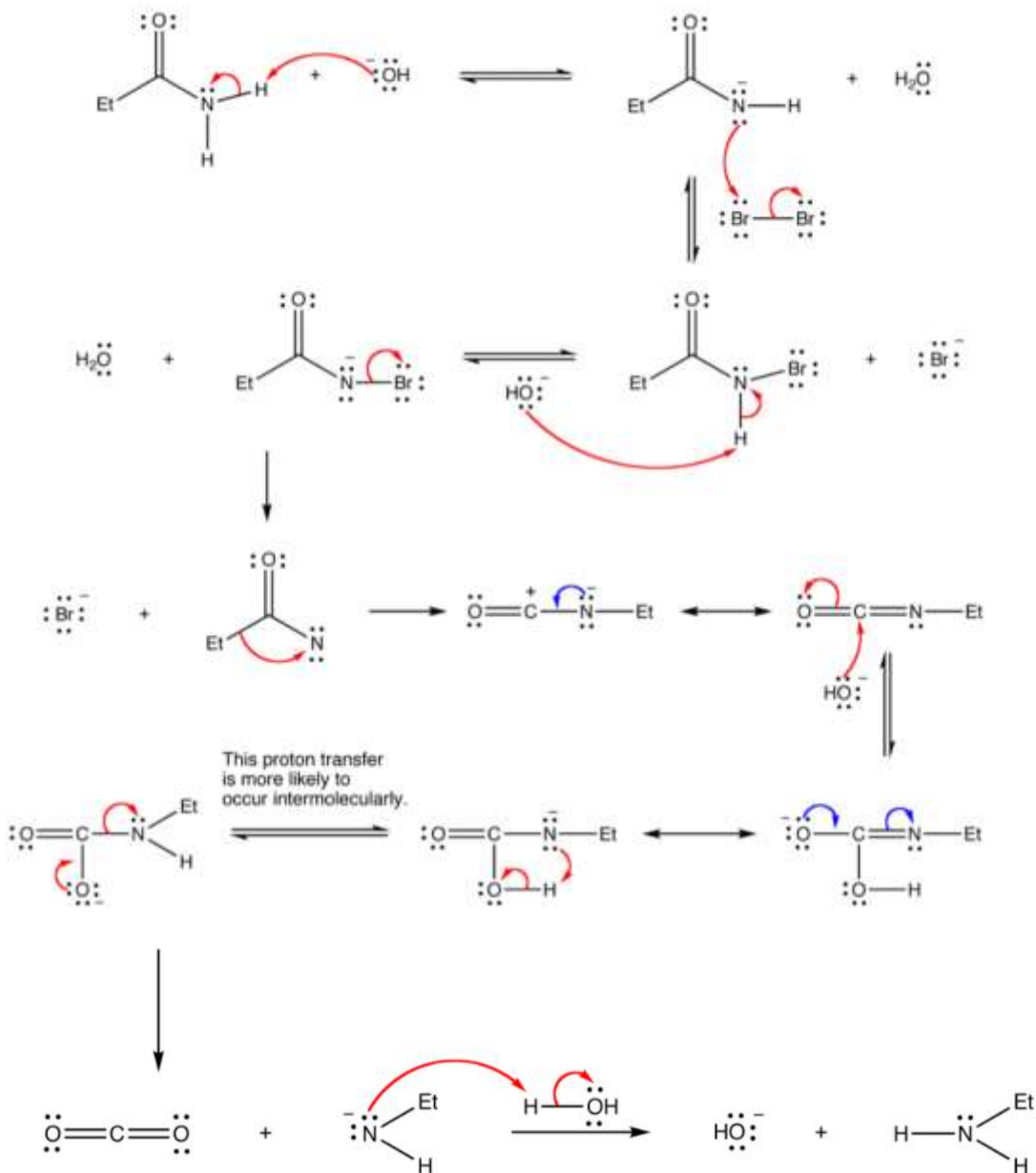
Step 5: Decarboxylation of carbamic acid occurs forming primary amine.



Example-



Mechanism of this reaction-



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