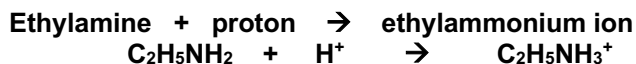


# Amines

## Basicity of Amines

**Amines are bases** (proton acceptors), reacting with acids to form salts. The lone pair of electrons on the N atom forms a dative covalent bond with the proton from an acid (like :NH<sub>3</sub>).



Amines react with acids to produce salts.



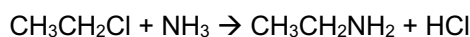
This reaction allows an amine to dissolve in water as its salt.

## Preparation of amines

**1) Formation of amines** by substitution of halogenoalkanes. Heating under pressure with excess ethanolic ammonia.



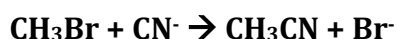
Eg to make ethylamine



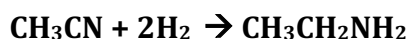
Note: multiple substitution can occur to give various products eg (CH<sub>3</sub>CH<sub>2</sub>)<sub>2</sub>NH, (CH<sub>3</sub>CH<sub>2</sub>)<sub>3</sub>N, [(CH<sub>3</sub>CH<sub>2</sub>)<sub>4</sub>N]<sup>+</sup>Cl<sup>-</sup>

## **2) Formation of primary aliphatic amines by reduction of nitriles**

Step 1 – Nucleophilic substitution of Br<sup>-</sup> by CN<sup>-</sup>



Step 2 – Reduction of the CN group by H<sub>2</sub> and Nickel catalyst.



This method gives a purer product than using ammonia because only the primary amine is formed.

**Formation of phenylamine** by reduction of nitrobenzene using tin and concentrated HCl, under reflux.

