

Amines

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ABSTRACT

Amines are one among the foremost important classes of organic compounds which may be derived once we replace one or more hydrogen atoms of ammonia molecules with an alkyl. An amine is usually a functional group with a nitrogen atom having a lone pair. Amines resemble ammonia structurally where nitrogen can bond up to three hydrogen atoms. It's also characterized by various properties that are supported carbon connectivity.

Keywords: Primary amine; Uses

INTRODUCTION

Compounds of nitrogen connected to a group are called as amides, they need a structure $R-CO-NR'R''$ and varies in properties with amines. Amines are organic compounds that contain nitrogen atoms with a lone pair. Basically, they're derived from ammonia (NH_3) during which one or more atom is replaced by an alkyl or aryl group, then they're referred to as alkyl amines and aryl amines respectively.

Nitrogen has 5 valence electrons then is trivalent with a lone pair. As per VSEPR theory, nitrogen present in amines is sp^3 hybridized and thanks to the presence of lone pair, it's pyramidal rather than tetrahedral shape which may be a general structure for many sp^3 hybridized molecules. Each of the three sp^3 hybridized orbitals of nitrogen overlap with orbitals of hydrogen or carbon depending upon the configuration of amines. thanks to the presence of lone pair, the C-N-H angle in amines may be a smaller amount than 109 degrees which is a characteristic angle of tetrahedral geometry. The angle of amines is near about 108 degrees.

Occurrence of Amines

Naturally, amines occur in proteins, vitamins, hormones, etc. and that they also are prepared synthetically to form polymers, drugs, and dyes.

Uses of Amines

Amines have a widespread application in our daily lives. Some uses of amines are listed below:

It is employed in water purification, medicine manufacturing and development of insecticides and pesticides.

It is involved within the production of amino acids which is that the building block of proteins in living beings. many sorts of vitamins also are made by amines. Pain-relieving medicines like Morphine and Demerol which also are referred to as analgesics are made up of amines.

Basicity of Amines

pKa value for primary & secondary amines is about 38, which makes them a true weak acid. Whereas if we take the pKb, it's about 4. This makes the amines far more basic than acidic. Thus, an solution of an amine strongly alkaline.

Reduction of Nitriles

We can get primary amines when nitriles are reduced with lithium aluminium hydride. This method is mainly used for the preparation of amines which contains one carbon atom more than the starting amine.

Gabriel Phthalimide Synthesis

We can get primary amines easily by Gabriel synthesis. In this process, on the treatment of phthalimide with ethanoic potassium hydroxide, we get potassium salts of phthalimide. When this is further heated with alkyl halide followed by alkaline hydrolysis then primary amine is produced. We cannot prepare aromatic primary amines because aryl halides do not undergo nucleophilic substitution with the anion which is formed by phthalimide.

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CONCLUSION

Similar to ammonia, primary & secondary amines have protic hydrogens and thus they showcase a degree of acidity. Whereas tertiary amines haven't any protic hydrogen and thus don't possess a degree of acidity.

REFERENCES

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