

Chemistry Notes for Class 12 on Aldehyde

Aldehyde is an organic compound which contain formyl group. Formyl group has R-CHO structure, which consists of a carbonyl center bonded to hydrogen and an R group which is in side chain. This group without R is known as aldehyde group. Aldehydes differ from **Ketones** in that the carbonyl is placed at the end of a carbon rather than between the two carbon atoms. Here in this post, Description of Aldehydes with Classification and Physical Properties are explained in a detailed manner. If you are interested you can also find out more details on Science topics from **Notes** Section.

Hybridization in Aldehydes

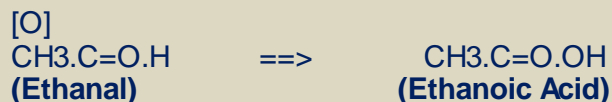
Aldehyde with the chemical formula (R-CHO) are attractive building blocks because they have the ability to easily react with many nucleophiles (a chemical species that donates an electron pair to an electrophile to form a chemical bond in relation to a reaction). Aldehydes feature an sp²-hybridized, planar carbon center that is connected by a double bond to oxygen and a single bond to hydrogen.

Aldehydes Preparation

Aliphatic aldehydes can be easily prepared by the oxidation of alcohols. Taking an example, ethanal, (Acetaldehyde) is prepared by the low speed addition of ethanol to a boiling sol. of chromic acid (conc. sulphuric acid to a di-chromate), by which the ethanol is oxidized. This oxidization can be referred to as a removal of two hydrogen atoms from the ethanol, in spite of the addition of an oxygen atom.



It is important that the aldehyde which is formed is removed from the oxidizing agent by distillation (process of separation) as soon as it is formed thereby preventing the further oxidation, as aldehydes can easily be further oxidized to carboxylic acids. For example, ethanal is very much oxidized to ethanoic acid (Acetic acid).



Aldehyde are reducing agents (LiAlH₄), and thus a characteristic addition and condensation of reactions. They can be readily polymerised. Lithium aluminium hydride is a strong reducing agent for polar double bonds, most easily thought of as a source of H⁻ (It will thus help in reducing aldehyde's, ketone, esters, carboxylic acid chlorides and even carboxylate salts to alcohols).

Amides and nitrites are reduced to amines. The partially negative hydrogen is reacted with the partially positive carbon. It can further also be used to reduce nitro groups and even as a nucleophile (a chemical species that donates an electron pair to an electrophile to form a

chemical bond in relation to a reaction) to displace a halide from an sp^3 carbon (C) or open an epoxide (a cyclic ether with three ring atoms).

Uses of Aldehyde

Just because of the high chemical reactivity of the aldehydes, they are important intermediates for

- The manufacture of resins (dry fruits)
- Plasticizers (compounds)
- Solvents (used in many of them)
- Dyes (coloring agents)
- Pharmaceuticals or Medicinal uses.

Sigma-Aldrich is a huge array of compounds containing the R-CHO functional group that are used as the building blocks in many of synthetic procedures.

