

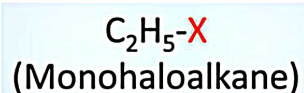
Classification of Haloalkanes & Haloarenes

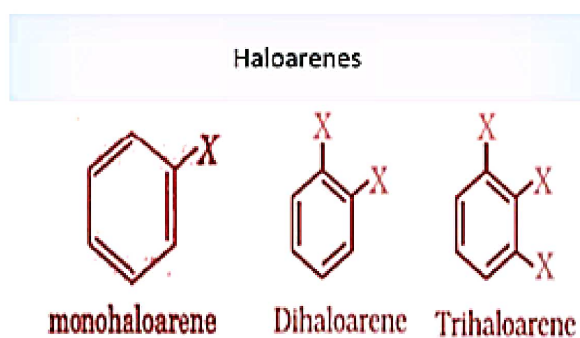
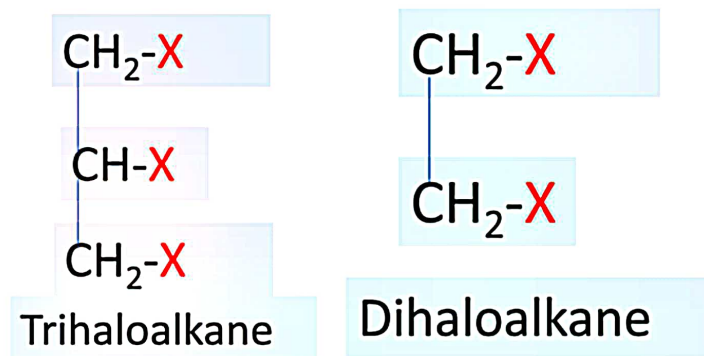
They can be classified on the basis of-

- Number of hydrogen atoms
- Compounds with sp^3 C—X Bond
- Compounds having the sp^2 C-X Bond

1) Number of Hydrogen Atoms

On the basis of the number of hydrogen, they can be divided into mono, di or poly (tri, tetra, and so on) compounds of haloalkanes and haloarenes. It is named depending on the number of halogen atom these compounds contain in their structures. For example,





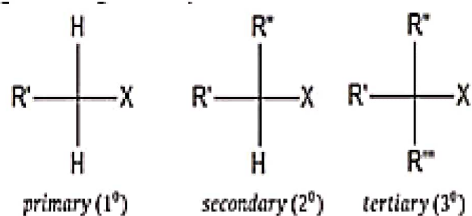
Monohalocompounds can again be classified into classes and subclasses on the basis of hybridization of the carbon atom to which the halogen atom is attached.

2) Compounds with sp^3 C—X Bond [Here X (Halogen Group) = F, Cl, Br, I]

These compounds can be further divided into three types. They are:

i) Alkyl Halides/ Haloalkanes (R – X)

In this class, the halogen atom is attached to an alkyl group. The general homologous formula followed by this class is $C_nH_{2n+1}X$. They are further classified into mainly three types on the basis of the carbon atom to which the carbon bearing halogen (X) atom is bonded—primary, secondary, and tertiary. This classification is based on the nature of carbon atom to which the halogen is attached.



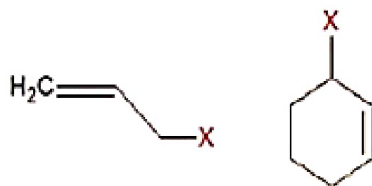
Classification of alkyl halides on the basis of nature of carbon atom to which the halogen is attached

Classification of Alkyl-Halide

ii) Allylic Halides

This classification of compounds is formed by bonding of halogen group having sp^3 hybridized carbon atom present next to a

carbon-carbon double bond structure (C=C). The carbon-carbon double bond structure is also known as allylic carbon. Thus, the name allylic halides.

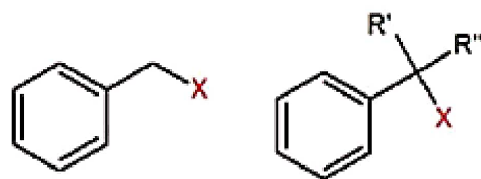


Examples of Allylic Halides- formed when halogen is bonded to sp^3 hybridised allylic carbon

Example of Allylic Halides

iii) Benzylic Halides

This type of compounds is formed when halogen atom is attached to an sp^3 hybridized carbon atom. The sp^3 hybridized carbon atom should be present next to an aromatic ring in order to form benzyl halides.



- When $R' = CH_3, R'' = H$ (2^0)
- When $R' = R'' = CH_3$ (3^0)

Benzylic Halides halogen atom is attached to a sp^3 hybridised carbon atom present next to an aromatic ring

Examples of Benzylic Halides

3) Compounds Having the sp^2C-X Bond

This class of compounds includes vinyl halides and aryl halides.

i) Vinyl Halides

These compounds are formed when halogen atom is attached to an sp^2 hybridized carbon atom present next to a carbon-carbon double bond ($C=C$).

ii) Aryl Halides

This class of compounds is formed when the halogen group is bonded to an sp^2 -hybridized atom of carbon in an aromatic ring.