

اد. كيمياء. كافيّة. أول علم - كيمياء حيوية  
 علم كافيّة

Basic organic chemistry

الكيمياء الكلاسيكية  
 علم كافيّة (كيمياء)

Alkyl Halids

Alkyl halides have the general formula:



R = simple alkyl or substituted gp.  
 X = halogen: F, Cl, Br, I

Examples:

$CH_4$   
 Methane

$CH_3$   
 Methyl gp.

$CH_3Cl$   
 chloromethane  
 methyl chloride

$CH_3F$   
 Methyl fluoride  
 Fluoromethane

$CH_3Br$   
 Methyl bromide  
 Bromomethane

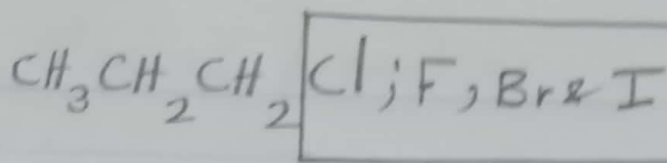
$CH_3I$   
 Methyl iodide  
 Iodomethane

$CH_3CH_2CH_3$   
 Propane

$CH_3CH_2CH_2$  —  $-CH_2CH_2CH_3$   
 n-Propyl gp.  
 1-Propyl gp.

$CH_3CH(CH_3)$   
 2-Propyl gp.  
 Isopropyl gp.

2Rx

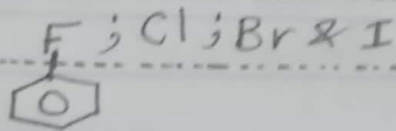
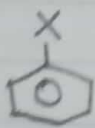


1-Chloropropane

n-Propyl chloride

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Important:



Fluorobenzene

Aryl halide

In aryl halides, the halogen atom is directly attached to an aromatic ring.

Alkyl halides differ so much from aryl halides in the preparation and chemical properties.

Most aryl halides are unreactive.

## Physical properties

### 1. Form (state):

Gases; e.g.,  $\text{CH}_3\text{Cl}$ ,  $\text{CH}_3\text{CH}_2\text{Cl}$

Liquids; e.g.,  $\text{CH}_3\text{CH}_2\text{CH}_2\text{Br}$   
*n*-Propyl bromide  
 1-Bromopropane

Solids; High molecular weight iodo comp.s

### 2. Melting & boiling points: Relatively, alkyl halides have m.p. & b.p. higher than hydrocarbons with the same C-number.

The order among the halides is:



المرتبة الأعلى  
 درجة الانصهار،  
 درجة الغليان  
 highest  
 m.p. &  
 b.p.

المرتبة الأدنى  
 m.p. &  
 b.p.

Solubility in water: Insoluble (unable to form H-bond with water)

Solubility in organic solvents, e.g., benzene;

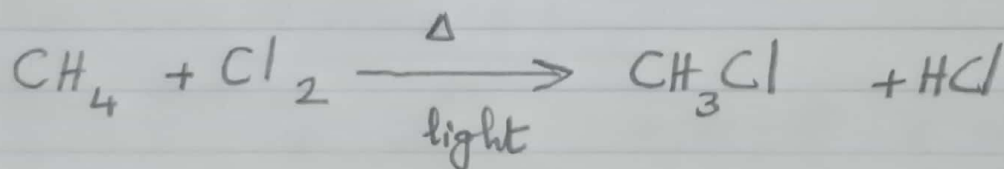
Soluble.

density ; RI alkyl iodide  
RBr alkyl bromide  
Polychloro comp.s

each of them is insoluble in water and is more dense than water.

Industrial source;

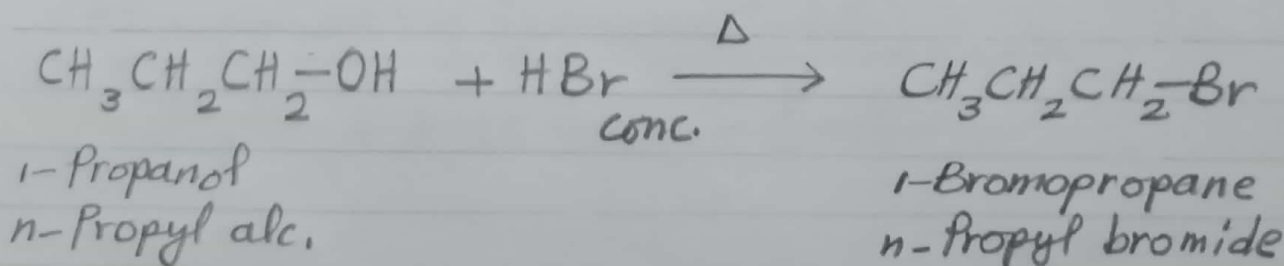
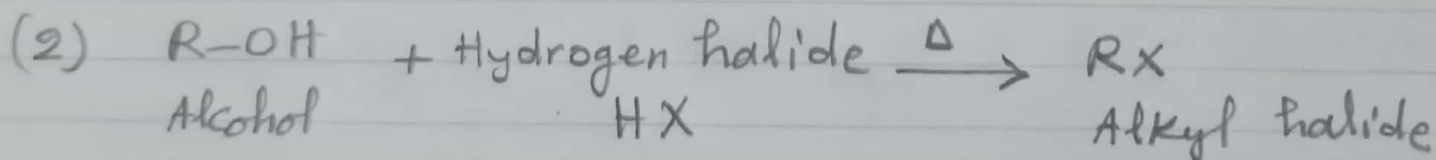
Ex:



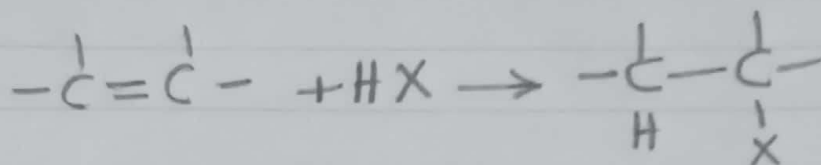
Preparation:

Ex:

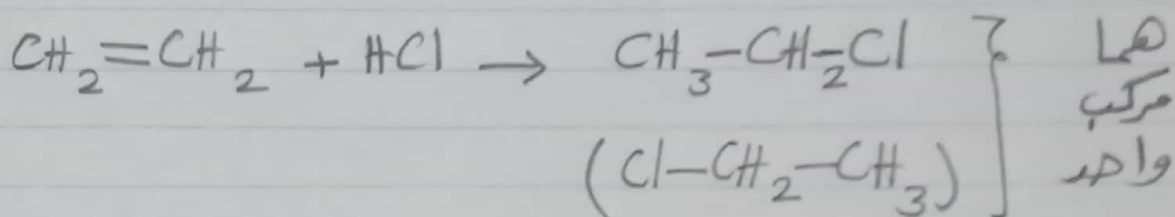
(1) الكلور (البروم)



(3) Addition of hydrogen halide, HX, to alkenes:

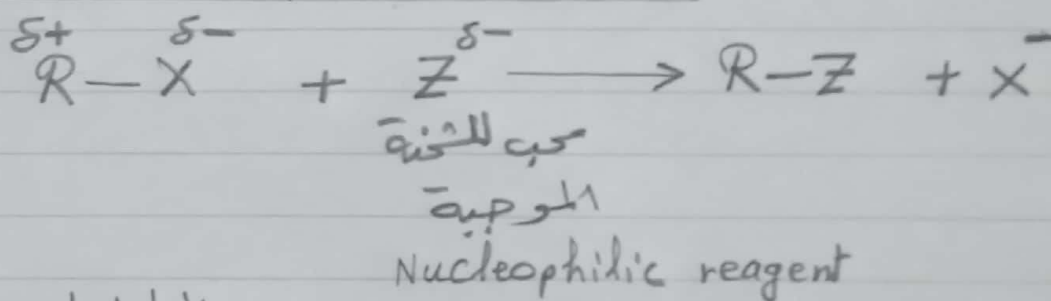


\* تذكر قاعدة ماركونيكوف

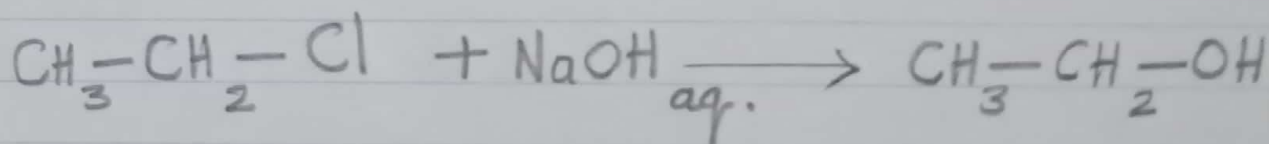


Chloroethane } لها نفس  
Ethyl chloride } الاسم

Reactions of alkenes:



substitution:



Elimination (of hydrogen halide):

