Ch 26
Sec 26.1
HW:Sec Rev 1-4,21,24acd

obj: List types of functional groups and predict products for substitution reactions.

Functional Groups

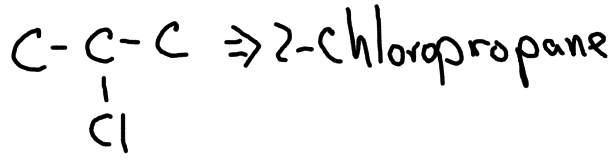
- A specific arrangement of atoms in an organic compound that is capable of specific chemical reactions
- The functional group replaces one or more hydrogen in a hydrocarbon.

(7)- 8 functional Groups

1) Halocarbons

R-X R⇒ Hydrocarbon Chain
X⇒ Functional Group.

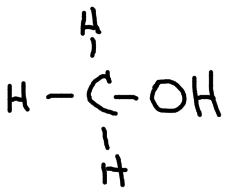
X can be F, Cl, Br, or I.



⇒2-chloropropane

2) Alcohols

R-OH OH ⇒ Hydroxyl Group.



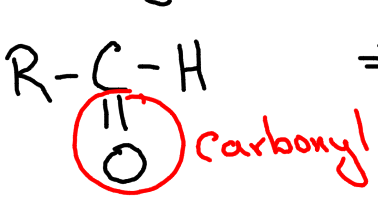
methanol

3) Ether

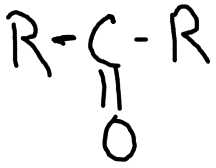
R-O-R

C-C-O-C ethylmethylether

4) Carbonyl Group

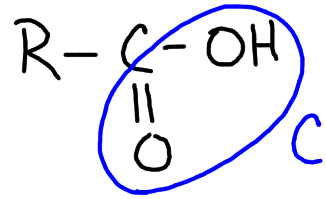


⇒ Aldehyde

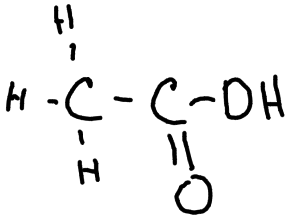


⇒ Ketones

5) Carboxylic Acids



Carboxyl Group.



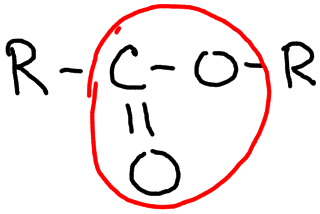
$HC_2H_3O_2$

ethanoic acid

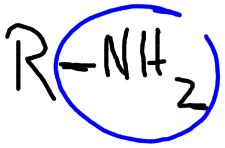
CH_3COOH

$HC_2H_3O_2$

6) Esters



7) Amine



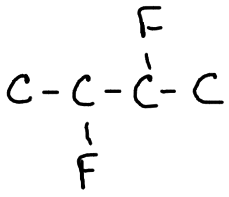
Halocarbons

- Halogens acting as functional groups.

F Cl Br I

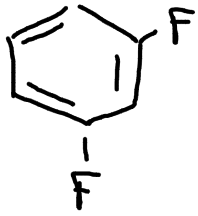
Floro Chloro Bromo Iodo

* Treated the same as substituents.



2,3-difloro-butane

Alkyl Halide



1,3 difloro benzene

m-difloro benzene

Aryl Halide

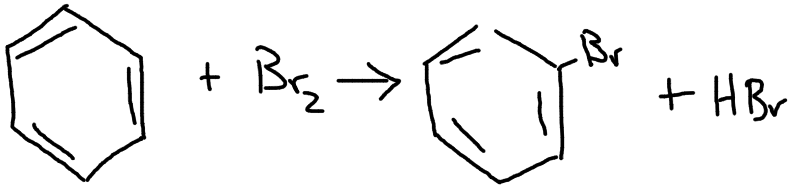
Substitution Reactions

- The replacement of an atom or group of atoms w/ an atom or group of atoms.

- Halogenation Rxn
  - A Halogen Replacing one or more Hydrogen on a Hydrocarbon.

$$R-H + X_2 \rightarrow R-X + HX$$

$$CH_4 + Cl_2 \rightarrow H-\underset{\displaystyle H}{\overset{\displaystyle H}{\underset{|}{\overset{|}{C}}}}-Cl + HCl$$

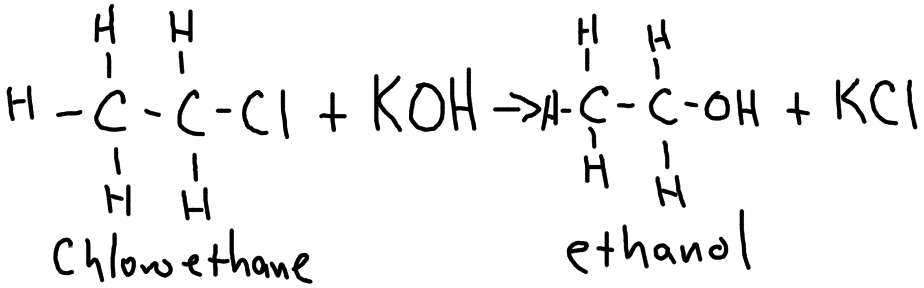


Bromobenzene

Displacement Rxns

- Halogens on carbon chains are easily displaced by a OH^- ion.
- $R-X + OH^- \rightarrow R-OH + X^{(-)}$

Alcohol + Salt



Chloroethane ethanol