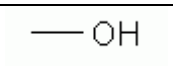
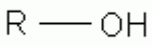
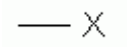
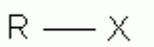
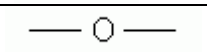
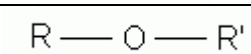
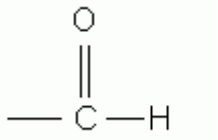
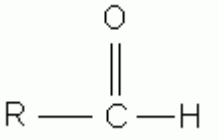
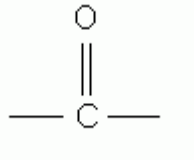
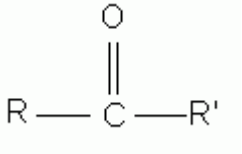
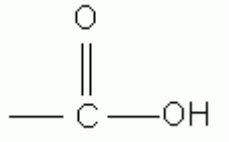
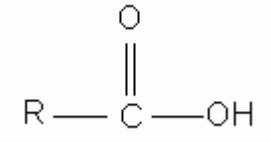
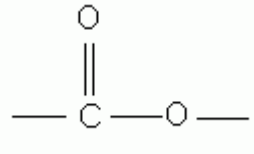
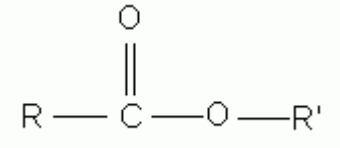
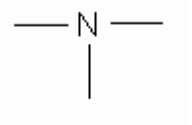
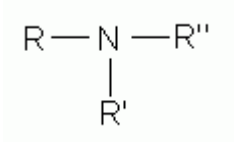
Chapter 21 - Other Organic Compounds

21-1 Functional Groups and Classes of Organic Compounds

Functional group: An atom or group of atoms that is responsible for the specific properties of an organic compound

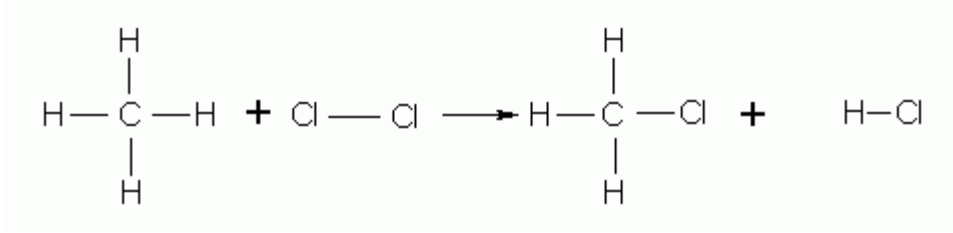
A. Alcohols
    1. Organic compounds that contain one or more hydroxyl (-OH) groups
    2. Properties of alcohols
        a. Simple alcohols are poisonous
        b. Alcohols are polar the more polar
            (1) Short chains and higher number of hydroxyl groups increases the polarity
        c. Alcohols are combustible
B. Alkyl Halides
    1. Organic compounds in which one or more halogen atoms are substituted for hydrogen atoms in a hydrocarbon
    2. Alkyl halides are widely used as refrigerants and contribute to the depletion of the ozone layer
C. Ethers
    1. Organic compounds in which two hydrocarbon groups are bonded to the same oxygen
    2. Ethers are used as solvents and as an octane enhancer (anti-knock agent) in gasoline
D. Aldehydes and Ketones
    1. Aldehydes
        a. Organic compounds in which the carbonyl group is attached to a carbon atom at the end of a carbon-atom chain
    2. Ketones
        a. Organic compounds in which the carbonyl group is attached to carbon atoms within the chain
    3. Uses of Aldehydes and Ketones
        a. Widely used to produce odors and flavors in commercial products
E. Carboxylic Acids
    1. Organic compounds that contain the carboxyl functional group
    2. As organic acids, they are used to provide tartness in food, and as a preservative
F. Esters
    1. Organic compounds with carboxylic acid groups in which the hydrogen of the hydroxyl group has been replaced by an alkyl group
    2. Esters are also responsible for many distinctive odors and flavors
G. Amines
    1. Organic compounds considered to be derivatives of ammonia
    2. Amines are found in alkaloids such as morphine and cocaine
    3. Amines and carboxylic acid groups are found in all amino acids

Table 21-7	**Classes of Organic Compounds**	
Class	Functional Group	General Formula
Alcohol		
Alkyl halide		
Ether		
Aldehyde		
Ketone		
Carboxylic acid		
Ester		
Amine		

21-3 Organic Reactions

A. Substitution Reactions

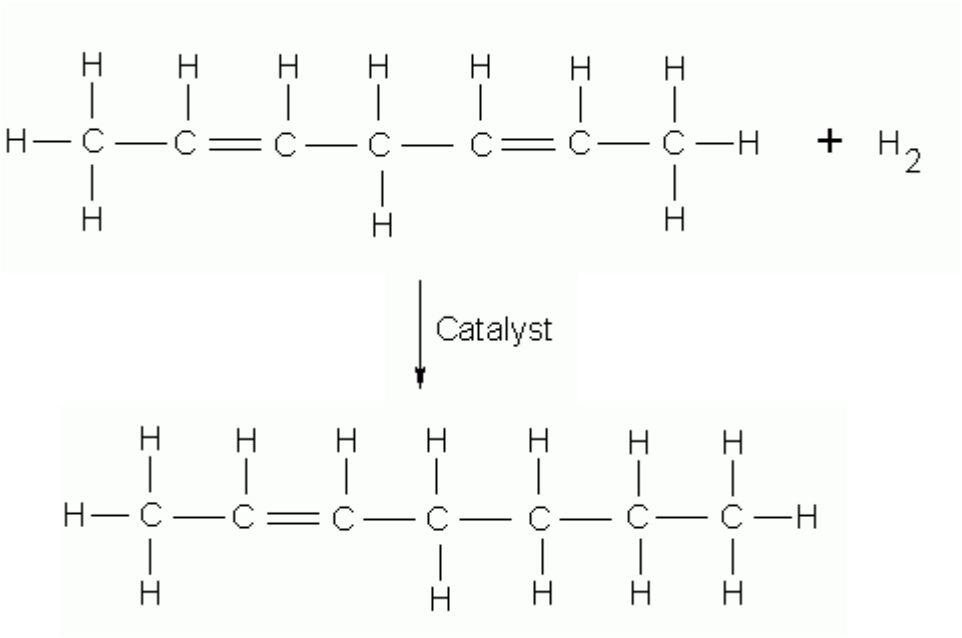
1. Rxns in which one or more atoms replace another atom or group of atoms in a molecule



methane chlorine chloromethane hydrogen chloride

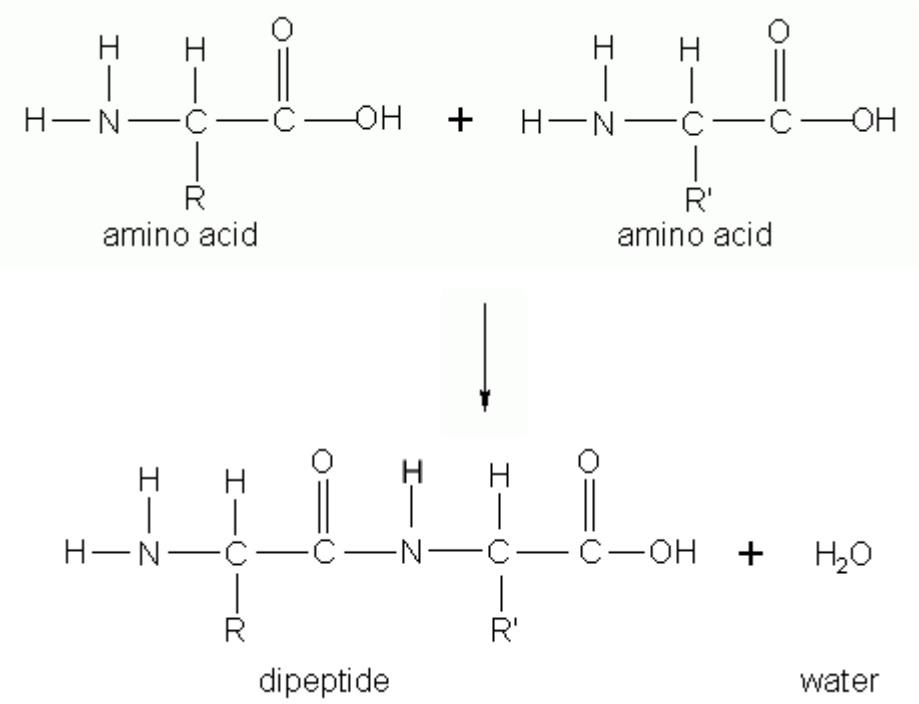
B. Addition Reactions

1. Rxns in which an atom or molecule is added to an unsaturated molecule and increases the saturation of the molecule
    a. Hydrogenation of a fatty acid:



C. Condensation Reactions

1. Rxns in which two molecules or parts of the same molecule combine
    a. Condensation of amino acids in protein formation



    b. A polymer of amino acids (many condensed into a long chain) is referred to as a polypeptide
    c. Polypeptides are the components of protein chains, therefore amino acids are the building blocks of all proteins