

Organic Reactions

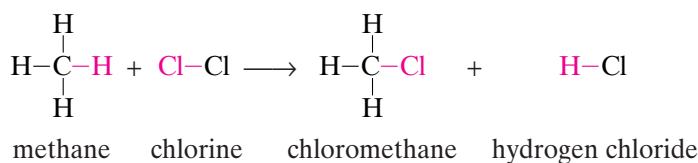
SECTION 4

OBJECTIVES

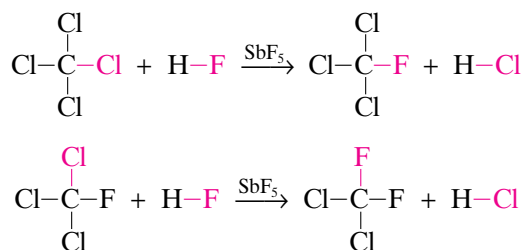
- Describe and distinguish between the organic reactions: substitution, addition, condensation, and elimination.
- Relate some functional groups to some characteristic reactions.
- Identify the two main types of polymers and the basic reaction mechanisms by which they are made.

Substitution Reactions

A **substitution reaction** is one in which one or more atoms replace another atom or group of atoms in a molecule. The reaction between an alkane, such as methane, and a halogen, such as chlorine, to form an alkyl halide is an example of a substitution reaction. Notice that in this reaction, a chlorine atom replaces a hydrogen atom on the methane molecule.



Additional compounds can be formed by replacing the other hydrogen atoms remaining in the methane molecule. The products are dichloromethane, trichloromethane, and tetrachloromethane. Trichloromethane is also known as chloroform, and tetrachloromethane is also known as carbon tetrachloride. CFCs are formed by further substitution reactions between chloroalkanes and HF.



Addition Reactions

An **addition reaction** is one in which two parts of a molecule are added to an unsaturated molecule, increasing the saturation of the molecule. A common type of addition reaction is hydrogenation. In *hydrogenation*, hydrogen atoms are added to an unsaturated molecule. Vegetable oils are triesters of unsaturated fatty acids, long chains of carbon atoms that have many double bonds. The following equation shows just one portion of an oil molecule. When hydrogen gas is blown through an oil, hydrogen atoms may add to the double bonds in the oil molecule.