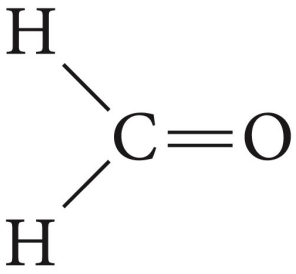
Chapter 2:L3

Reactions of alkanes

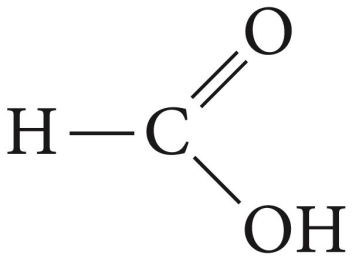
Reactions of Alkanes

Single carbon-carbon bonds
Nonpolar therefore relatively inert and often used as solvents
Reacts with oxygen and halogens.

In which compound is carbon more oxidized, formaldehyde (CH_2O) or formic acid(HCO_2H)?



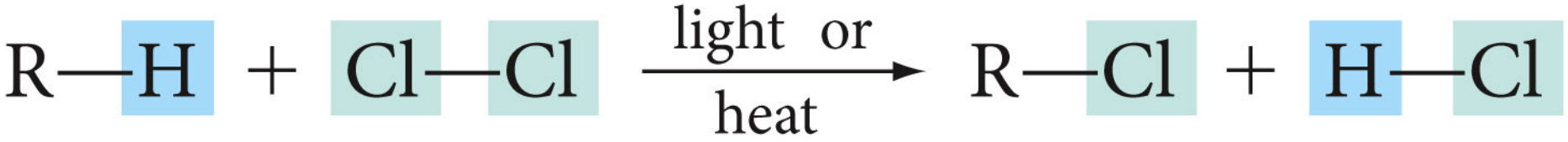
formaldehyde



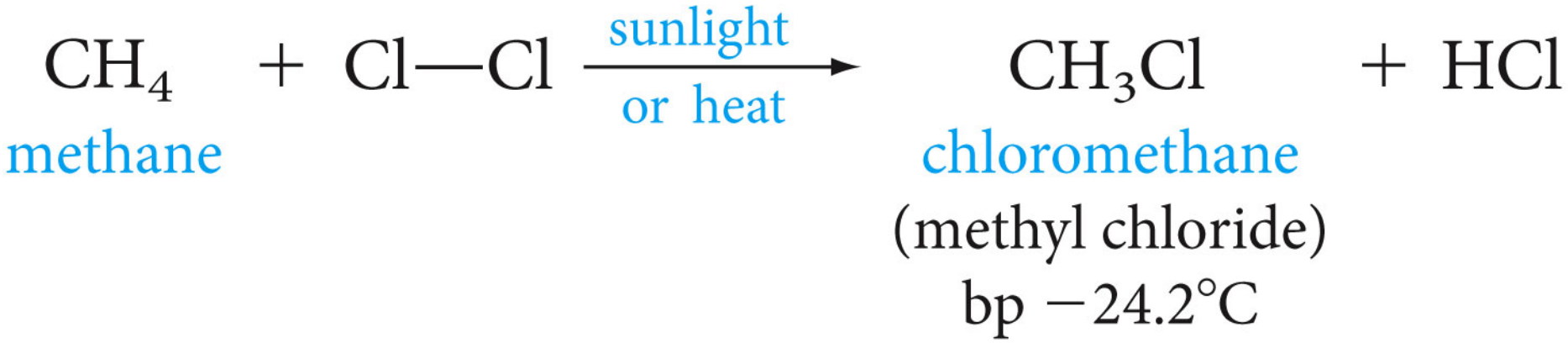
formic acid

Halogenation of Alkanes

When a mixture of alkane and chlorine is stored at low temperature in the dark, no reaction occurs. While in sunlight or at high temperature, however, an exothermic reaction occurs. Where one or more of the hydrogen atoms is replaced by chlorine.

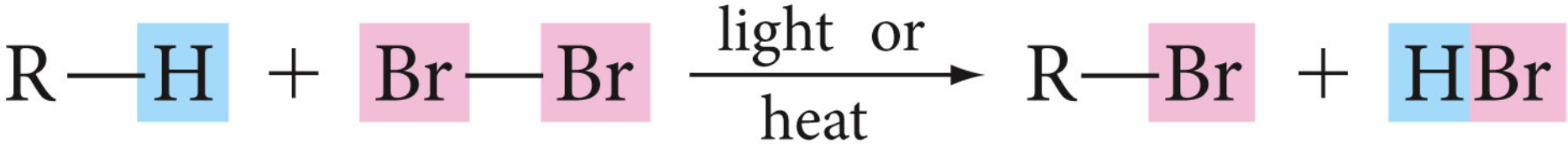


Example for methane

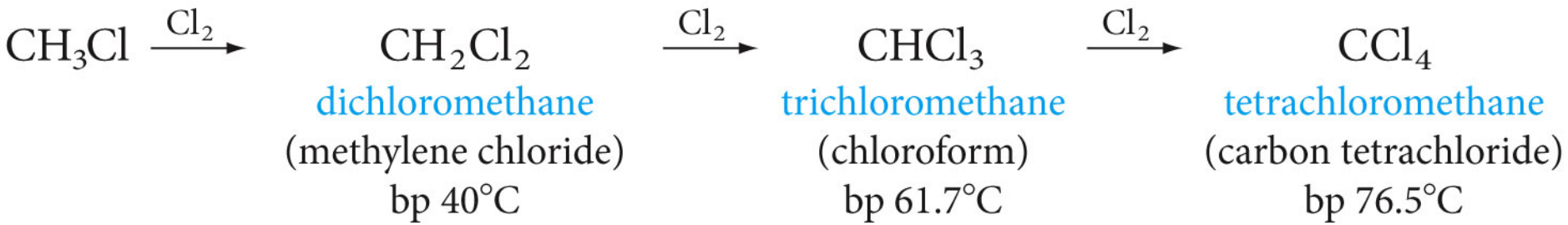


The reaction is called chlorination and is a substitution reaction

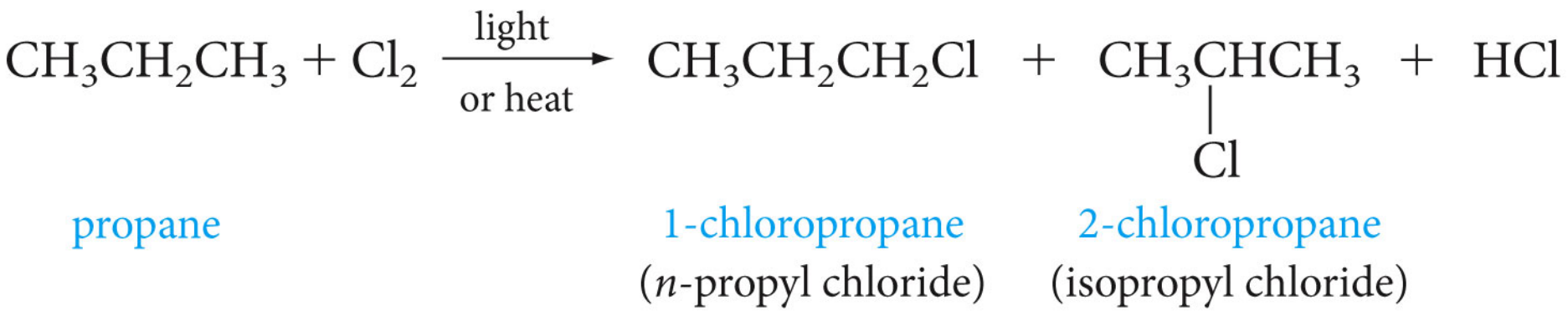
Bromination



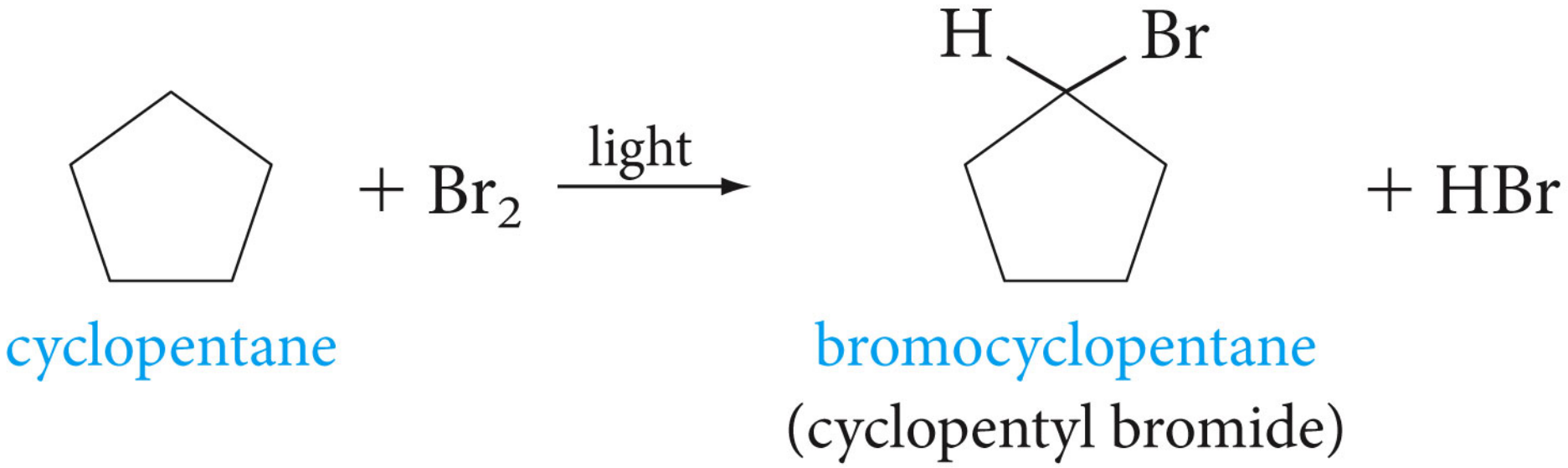
In excess halogen, the reaction can continue further to give polyhaloganated products.



A mixture of products may be obtained when longer chained alkanes are halogenated.

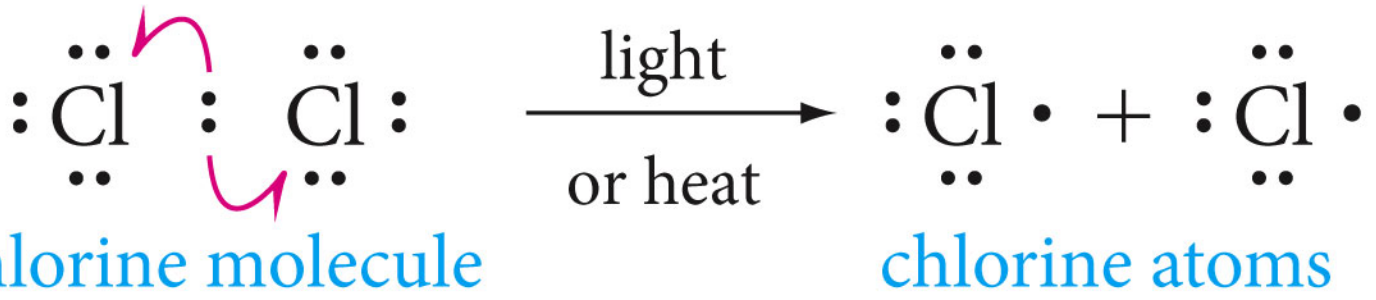


Unsubstituted cycloalkanes, where all the hydrogens are equivalent, a single organic product can be obtained.

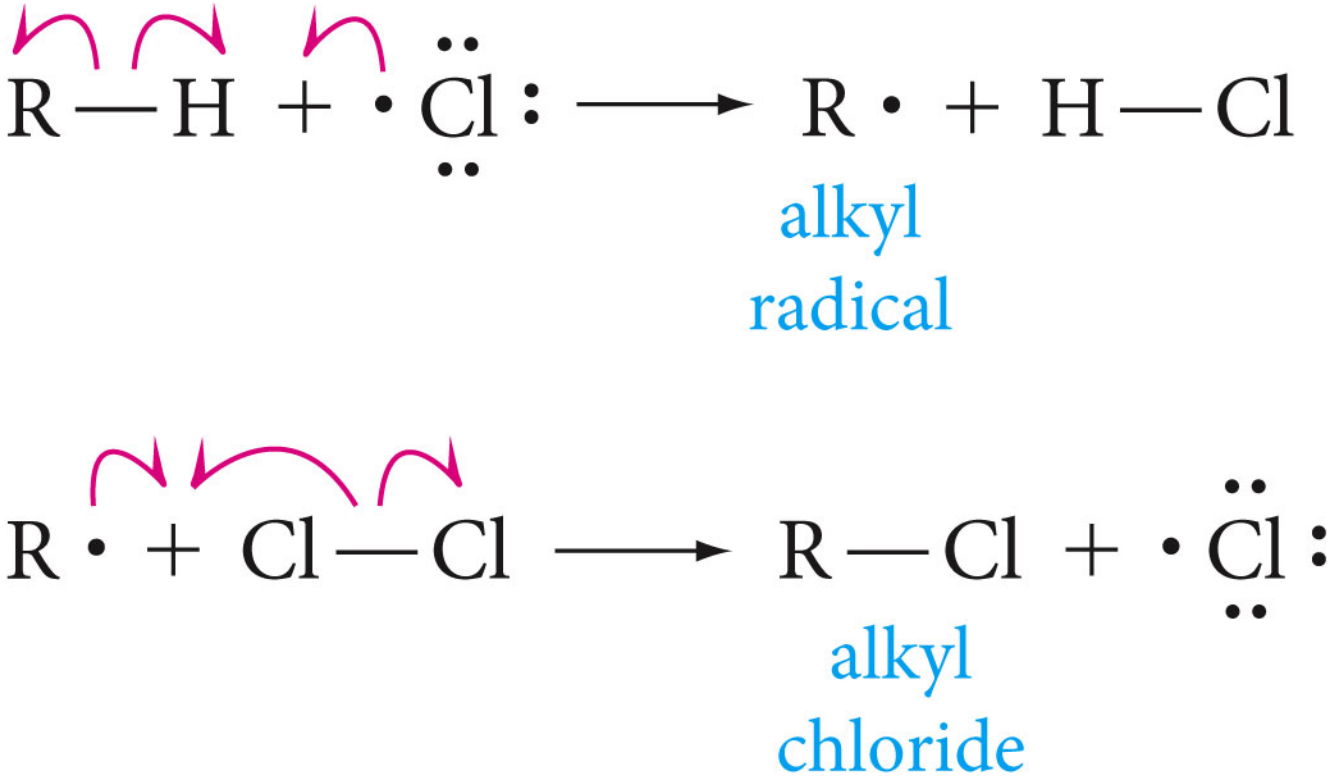


Free-Radical Chain Reaction Mechanism of Halogenation

initiation



propagation



termination