-Alkane Mechanisms

17 December 2012
17:25

Free radical substitution.

Initiation:

$Cl_2 \xrightarrow{\text{UV light}} Cl^{\bullet} + Cl^{\bullet}$ (free radical)

$Cl-Cl \rightarrow 2Cl^{\bullet}$ homolytic fission

Propagation:

$Cl^{\bullet} + C_2H_6 \longrightarrow C_2H_5^{\bullet} + HCl$

$C_2H_5^{\bullet} + Cl_2 \longrightarrow C_2H_5Cl + Cl^{\bullet}$

Termination:

$C_2H_5^{\bullet} + Cl^{\bullet} \longrightarrow C_2H_5Cl$

Combustion

- Alkanes burn in excess oxygen to produce CO_2 and H_2O
- When burned in plenty of oxygen, alkanes become clean fuels
- When burned in a limited supply of oxygen, they undergo incomplete combustion and form carbon monoxide, CO
- Incomplete combustion can be occur in poorly ventilated areas and in car engines

$CH_4(g) + 2O_2(g) \longrightarrow CO_2(g) + 2H_2O(g)$

Incomplete

$CH_4(g) + 1\frac{1}{2}O_2(g) \rightarrow CO(g) + 2H_2O(g)$