AS EQUATIONS - Unit 1

Alkanes – with O_2

Complete combustion $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$

Incomplete combustion $CH_4 + 1.5O_2 \rightarrow CO + 2H_2O$

Alkanes – with Cl_2, UV

$CH_4 + Cl_2 \rightarrow CH_3Cl + HCl$

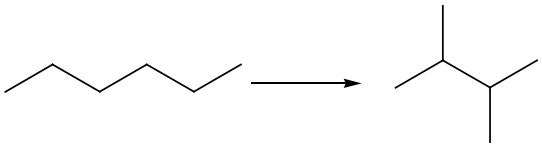
Mechanism = Photochemical free radical substitution.

Alkanes – improving the quality of fuels

Catalytic Cracking $C_{10}H_{22} \rightarrow C_5H_{12} + C_5H_{10}$

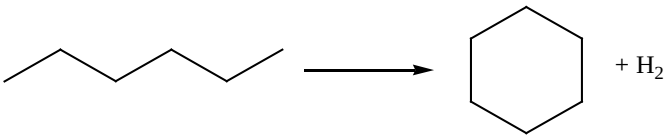
Conditions – Heat (600^{o}C), Al_2O_3

Isomerisation



Conditions - Heat, Pt

Reformation



Conditions - Heat, Pt

Alkenes – with H_2 $H_2C=CH_2 + H_2 \rightarrow CH_3CH_3$

Conditions - Heat, **Ni**

Alkenes – with Br_2 / hexane $CH_3CH=CH_2 + Br_2 \rightarrow CH_3CHBrCH_2Br$

Colour change (orange to colourless)

Mechanism = Electrophilic Addition

Alkenes – with Bromine water $CH_3CH=CH_2 + Br_2 / H_2O \rightarrow CH_3CHOHCH_2Br$

Colour change (orange to colourless)

Mechanism = Electrophilic Addition

Alkenes – with HBr/dry/gas $CH_3CH=CH_2 + HBr \rightarrow CH_3CH_2BrCH_3$

Major product

Mechanism = Electrophilic Addition

Explanation for major product = Secondary carbocationic intermediate is more stable than primary.

Alkenes – with $KMnO_4$ / H_2SO_4

$CH_3CH=CH_2 + [O] \rightarrow CH_3CHOHCH_2OH$

Colour change (purple to colourless – H2SO4)

Alkenes – Polymerisation