

See the possible reactions of butane during thermal cracking.

- $$\text{CH}_3-\text{CH}_2-\text{CH}_2-\text{CH}_3 + \text{Heat} \rightarrow \text{CH}_4 + \text{CH}_2=\text{CH}-\text{CH}_3$$

$$\text{C}_4\text{H}_{10} + \text{Heat} \rightarrow \text{CH}_4 + \text{C}_3\text{H}_6$$
- $$\text{CH}_3-\text{CH}_2-\text{CH}_2-\text{CH}_3 + \text{Heat} \rightarrow \text{CH}_3-\text{CH}_3 + \text{CH}_2=\text{CH}_2$$

$$\text{C}_4\text{H}_{10} + \text{Heat} \rightarrow \text{C}_2\text{H}_6 + \text{C}_2\text{H}_4$$

The products formed as a result of thermal decomposition depends upon many factors like nature of hydrocarbons, temperature, pressure etc.

When we discuss the decomposition possibilities of hexane, look at the various possibilities, when the chain containing 6 carbon atoms undergo decomposition there are many possibilities.

1 + 5, 2 + 4 and 3 + 3 are possible.

- $$\text{CH}_3-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_3 + \text{Heat}$$

$$\rightarrow \text{CH}_4 + \text{CH}_2=\text{CH}-\text{CH}_2-\text{CH}_2-\text{CH}_3$$

$$\text{C}_6\text{H}_{14} + \text{Heat} \rightarrow \text{CH}_4 + \text{C}_5\text{H}_{10}$$
- $$\text{CH}_3-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_3 + \text{Heat}$$

$$\rightarrow \text{CH}_3-\text{CH}_3 + \text{CH}_2=\text{CH}-\text{CH}_2-\text{CH}_3$$

$$\text{C}_6\text{H}_{14} + \text{Heat} \rightarrow \text{C}_2\text{H}_6 + \text{C}_4\text{H}_8$$
- $$\text{CH}_3-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_3 + \text{Heat}$$

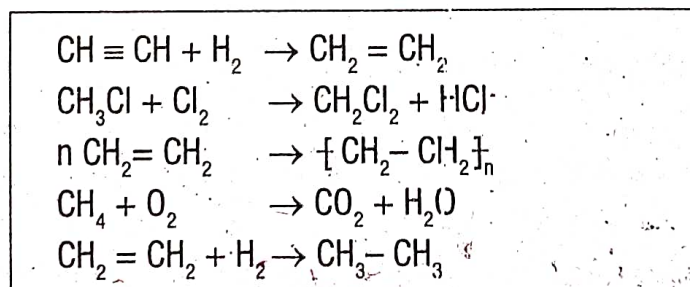
$$\rightarrow \text{CH}_3-\text{CH}_2-\text{CH}_3 + \text{CH}_2=\text{CH}-\text{CH}_3$$

$$\text{C}_6\text{H}_{14} + \text{Heat} \rightarrow \text{C}_3\text{H}_8 + \text{C}_3\text{H}_6$$

When alkanes undergo thermal decomposition, the products contain simple alkenes and simple alkanes.

From higher hydrocarbons, butane, the many component of LPG and other hydrocarbons can be made by thermal cracking. Moreover thermal cracking is used to convert hydrocarbon polymers to simpler hydrocarbons.

Completion of the table 7.3 (Textbook page 125)



Match columns A, B and C suitably. (Textbook page 125)

Reactants (A)	Product/Products (B)	Name of the reaction (C)
$\text{CH}_3-\text{CH}_3 + \text{Cl}_2$	$\text{CH}_3-\text{CH}_2\text{Cl} + \text{HCl}$	Substitution reaction
$\text{C}_2\text{H}_6 + \text{O}_2$	$\text{CO}_2 + \text{H}_2\text{O}$	Combustion
$n \text{CH}_2 = \text{CH}_2$	$\text{[CH}_2 - \text{CH}_2\text{]}_n$	Polymerisation
$\text{CH}_3-\text{CH}_2-\text{CH}_3$	$\text{CH}_2 = \text{CH}_2 + \text{CH}_4$	Thermal cracking
$\text{CH} \equiv \text{CH} + \text{H}_2$	$\text{CH}_2 = \text{CH}_2$	Addition reaction