

CHAPTER NO 10

CHEMICAL ENERGETICS

Q1. Define thermochemistry. What is thermochemical reaction? Write the names of its two kinds and define them.

THERMOCHEMISTRY:

“The branch of chemistry that deals with the study of the heat changes during chemical reaction is called Thermochemistry.”

THERMOCHEMICAL REACTION:

“The chemical reaction during which material changes are accompanied with the change in heat energy are called Thermochemical reaction.”

KINDS OF THERMOCHEMICAL REACTION:

There are two types of thermochemical reactions.

i. Exothermic Reaction

ii. Endothermic Reaction

1. EXOTHERMIC REACTION:

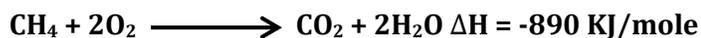
“The chemical reaction during which that energy is evolved (released) is called Exothermic reaction.”

Example:

Formation of water is an example of exothermic reaction.



When CH_4 burns with oxygen it produces CO_2 and H_2O . This reaction is also the example of exothermic reaction.

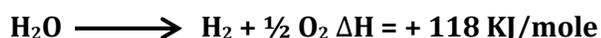


ENDOTHERMIC REACTION:

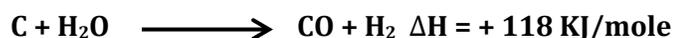
“The chemical reaction during which heat energy is absorbed is called Endothermic reaction.”

Example:

When water decomposes, it absorb energy



When carbon reacts with water , it produce CO and H_2 gas and absorb energy



Q2. Define the following terms:

i. Heat Contents

ii. Heat of neutralization

iii. Enthalpy of a reaction

1. HEAT CONTENTS:

“The energy possessed by a substance is known as Heat content.”

2. HEAT OF NEUTRALIZATION:

“The amount of heat which release during neutralization process is known as Heat of neutralization.”

Example: $\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O}$ $\Delta H = -57.3 \text{ KJ/mol}$

3. ENTHALPY OF A REACTION:

“The heat evolved (released) or absorbed during a chemical reaction which is carried out at constant pressure is known as Enthalpy of a reaction”

Q3. Define heat of reaction. How the change in enthalpy (ΔH) is calculated?

HEAT OF REACTION:

“The amount of heat evolved or absorbed during a chemical reaction is known as Heat of reaction.”

MEASUREMMENT OF ENTHALPY:

“It is obtained by subtracting the enthalpy of reactant (H_1) from enthalpy of product (H_2)

$$\Delta H = H_2 - H_1$$

Where as,

ΔH = Change in enthalpy

H_1 = Heat content of reactants

H_2 = Heat content of product

Q4. Write down the uses of exothermic reaction.

USES OF EXOTHERMIC REACTION:

i. Heat energy released during exothermic reaction is used to cool food.

ii. Heat energy released during exothermic reaction is also used in power generating system

iii. The energy obtained by exothermic reaction is used for welding purpose.

iv. All auto mobiles need heat energy to move.

v. Heat energy is used to keep food warm in food pouches.

Q5. Write down the difference between exothermic reaction and endothermic reaction.

	EXOTHERMIC REACTION	ENDOTHERMIC REACTION
01	The reaction in which heat energy is released	The reaction in which heat energy is absorbed
02	Exo stands for outside while therm means heat	Endo stands for inside while therm means heat
03	It is denoted by ΔH with negative sign	It is denoted by ΔH with positive sign
04	Combustion, single displacement, neutralization and addition reactions are examples of exothermic reaction	Decomposition reactions are the examples of endothermic reaction
05	The general representation is Reactant \longrightarrow Product + heat	The general representation is Reactant + heat \longrightarrow product