

THERMOCHEMISTRY



Thermochemistry is the branch of physical chemistry which deals with the thermal or heat changes caused by chemical reactions.

Heat Capacity (M_s)

The amount of heat required to raise the temperature by 1°C or 1K of a given amount of a substance. Its unit is **Joule per Kelvin**

Total heat given to increase the temperature by Δt .

$$q = ms\Delta t$$

Molar Heat Capacity (C_m)

The amount of heat required to raise the temperature by 1°C of **1 mole of a substance**.

CLASSIFICATION OF MOLAR HEAT CAPACITY

1. Molar heat capacity at constant pressure (C_p)
2. Molar heat capacity at constant volume (C_v)

RELATION BETWEEN C_p AND C_v

$$C_p - C_v = R \quad (\text{Mayor's formula})$$

$$C_p \cdot C_v = \gamma \quad (\text{Poison's Ratio})$$

Intensive Property

The property which does not depend upon the mass of substance is called **intensive property**. e.g. density, refractive index, specific heat, etc.

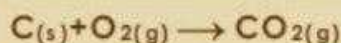
Extensive Property

Mass dependent properties are called extensive properties. e.g. ΔH , ΔS , ΔG , V , U , Resistance, Number of moles etc.

1. Two extensive property can be added
2. Ratio of two extensive properties is Intensive.
3. Intensive properties can not be added directly.

Heat of Formation

Enthalpy change during the formation of 1 mole of a compound from its most stable common occurring form (also called reference state) of elements is called heat of formation.



$$\Delta H = \Delta H_f(\text{CO}_2)$$

Heat of Combustion

It is the enthalpy change (always negative) when one mole of the substance undergo complete combustion.



$$\Delta H^\circ = \Delta H_r^\circ(\text{CO}_2)$$

Heat of Atomisation

When one mole of any substance is converted into gaseous atoms enthalpy change during the process is called heat of atomisation. It is always positive.