

* Enthalpy of Combustion

(5)

The enthalpy change (ΔH) accompanying complete combustion of one mole of the substance at 298 K & 1 atm pressure, is called enthalpy of combustion.

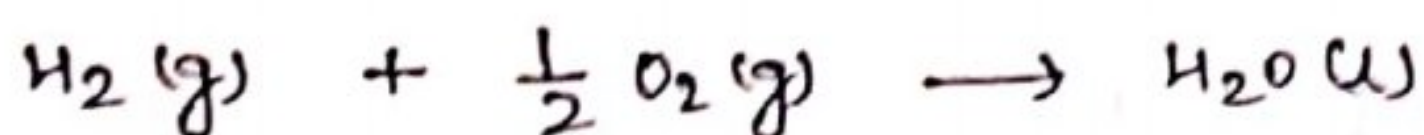
for examples :-

① Combustion of Methane:



$$\Delta H_{\text{comb}}^{\circ} = -890.3 \text{ kJ mol}^{-1}$$

② Combustion of Hydrogen:



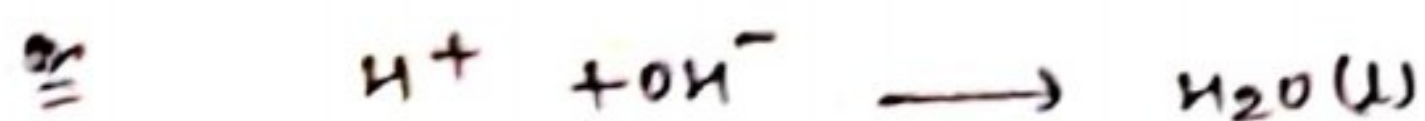
$$\Delta H_{\text{comb}}^{\circ} = -285.29 \text{ kJ mol}^{-1}$$

* Enthalpy of Neutralisation :-

The enthalpy change when one mole of an acid such as HCl, H_2SO_4 , HNO_3 etc is neutralised by one mole of a base such as NaOH, KOH etc in dilute soln at 25°C and 1 atm pressure, is called enthalpy of neutralisation.

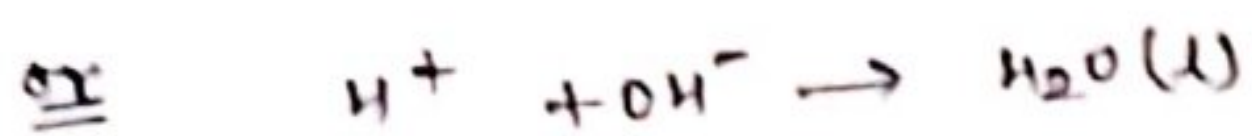
for example

① The neutralisation of HCl by NaOH in dilute soln is shown as.



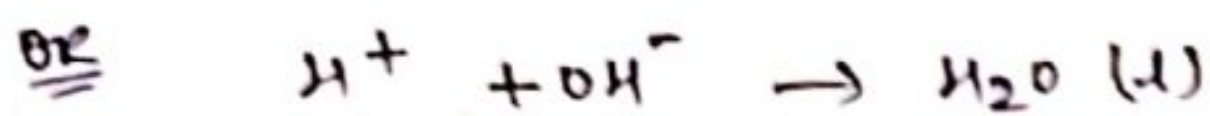
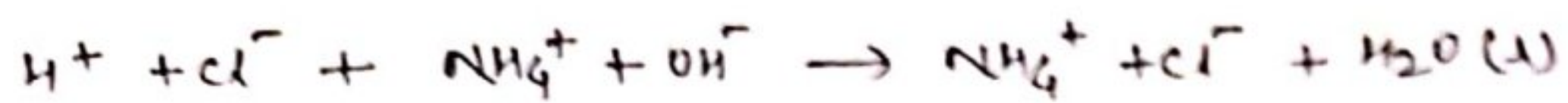
$$\Delta H_{\text{neut}}^{\circ} = -57.32 \text{ kJ mol}^{-1}$$

(2) The neutralisation of Acetic acid with NaOH is shown as—



$$\Delta H_{\text{neu}}^\circ = -55.23 \text{ kJ mol}^{-1}$$

(3) The neutralisation of HCl and NH_4OH is shown as—



$$\Delta H_{\text{neu}}^\circ = -51.34 \text{ kJ mol}^{-1}$$

* Enthalpy of Ionisation :-

The minimum amount of energy required to remove the most loosely bound electron from an isolated gaseous atom to form gaseous cation is called its ionisation enthalpy.

for example—

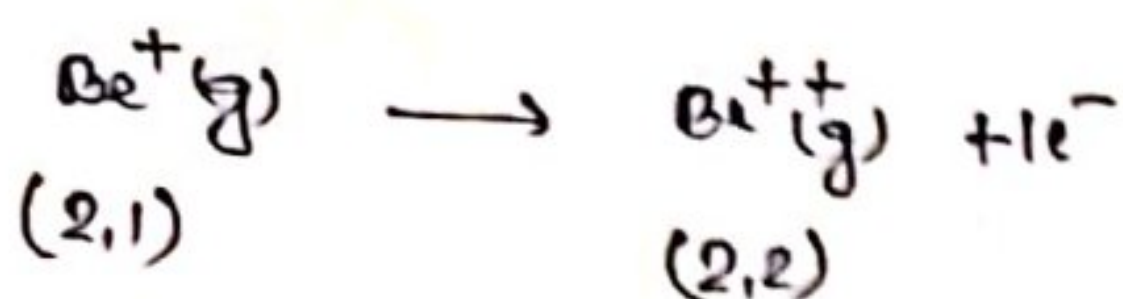


$$\Delta H_{\text{ion}}^\circ = 520 \text{ kJ mol}^{-1}$$



$$\Delta H_{\text{ion}}^\circ = 899 \text{ kJ mol}^{-1}$$

called first ionisation enthalpy



$$\Delta H_{\text{ion}}^\circ = 1757 \text{ kJ mol}^{-1}$$

called 2nd ionisation enthalpy.

After removal of one electron in 'Be', a cation (Be^+) is formed. This cation has one electron less than the protons. Thus the effective nuclear charge (Z_{eff}) is increased. Electrons are attracted towards the nucleus by greater force. It becomes difficult to remove the electron from the cation (Be^+). Therefore, ionisation energy (enthalpy) required to remove another electron from (Be^+) is much higher.

* Factors on which ionisation enthalpy depends:-

It depends upon following factors:—

- ① size of the atom
- ② Magnitude of nuclear charge
- ③ Screening or shielding effect
- ④ Penetrating effect.
- ⑤ Electronic configuration.