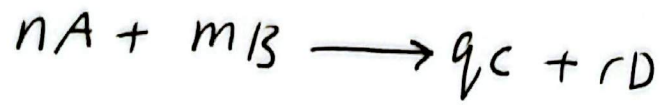


* Entropy Changes of Chemical Reactions.

For Chemical reactions such as:



The Standard Entropy Change is given by

$$\Delta S^\circ = [q S_C^\circ + r S_D^\circ] - [n S_A^\circ + m S_B^\circ]$$

where S° indicates the standard state Entropy (298K) of the indicated species.

The entropy of 1 mole of a substance in pure state at 1 atm and 25°C is defined as standard Entropy.

However, the Entropy Change at other temperatures needs to be

to be estimated taking into account the specific heats.

- Example:

Estimate ΔS when one mole of $H_2O(s)$ at $263 K^\circ$ and 1 atm is converted into $H_2O(l)$ at $283 K^\circ$ and 1 atm pressure.

Solution:

$$C_p [H_2O(s)] = 0.126T + 2.09 \text{ J K}^{-1} \text{ mol}^{-1}$$

$$C_p [H_2O(l)] = 75.3 \text{ J K}^{-1} \text{ mol}^{-1}$$

The latent heat of fusion is 6 kJ mol^{-1}

$$\Delta S = \int_{263}^{273} \frac{C_p dT}{T} + \frac{6000}{273} + \int_{273}^{283} \frac{75.3 dT}{T}$$

$$= 26 \text{ J K}^{-1} \text{ mol}^{-1}$$

$$\Delta S = 26 \text{ J mol}^{-1} \text{ K}^{-1}$$