Answer on Question #55388 – Chemistry – General Chemistry

Question:
Evaluate the standard reaction enthalpy (ΔrH°) at 298 K. (2 points)

Answer: The standard reaction enthalpy is the enthalpy change which occurs in system where 1 mole of substance is changed (reacted) in chemical reaction under standard conditions: T=273, 15 K, p=1 bar. At other temperatures enthalpy could be calculated with Kirchhoff's Law:

$$\Delta_r H_{298} = \Delta_r H^0 + \int_{273}^{298} \Delta_r C_p(T) dT$$

Where
Cp – heat capacity (under constant pressure)
$\Delta_r H_{298}$, $\Delta_r H^0$ – are the enthalpy at the respective temperatures

Note that this equation can be applied only to small temperature changes, (<100 K) because over a larger temperature change, the heat capacity is not constant and temperature dependence ($\Delta C_p = \Delta a + \Delta bT + \Delta cT^2 + \Delta d/T^2$) must be applied.