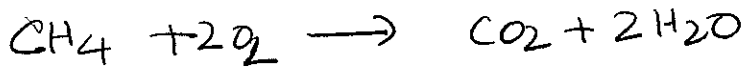


CONSIDER 1 MOLE OF GAS AT NTP



$$\Delta H_f^\circ \text{CO}_2 \rightarrow -393 \text{ kJ/mol}$$

$$\Delta H_f^\circ \text{H}_2\text{O}(g) \rightarrow -241.8 \text{ kJ/mol}$$

$$\Delta H_f^\circ \text{CH}_4(g) \rightarrow -74.8 \text{ kJ/mol}$$

$$\Delta H_R = \sum_{\text{PROD}} (n_i) \Delta H_{f_i} - \sum_{\text{REAC}} (n_j) (\Delta H_j)$$

$$\Delta H_R = 802 \times 10^3 \text{ kJ/kgmol} = 802 \times 10^3 \text{ kJ/kmol}$$

$$= 191.93 \times 10^3 \text{ kcal.}$$

AFT CALCULATION

$$\Delta H_{298}^{\text{com}} = 191 \times 10^3 \text{ kcal FOR 1 kmol.}$$

SPECIFIC HEAT CAPACITY OF POC

$$= n_{\text{CO}_2} \left[10.55 + 2.16 \times 10^{-3} T - \frac{2.04 \times 10^5}{T^2} \right] + n_{\text{H}_2\text{O}} \left[7.17 + 2.56 \times 10^{-3} T + \frac{0.08 \times 10^5}{T^2} \right]$$

$$n_{\text{N}_2} \left[6.66 + 1.02 \times 10^{-3} T \right]$$

HEAT INPUT = HEAT OUTPUT

$$191.93 \times 10^3 = \int_{298}^{T_f} 74.3072 dT + \int_{298}^{T_f} 14.84 \times 10^{-3} T \cdot dT + \int_{298}^{T_f} \frac{-1.88 \times 10^5}{T^2}$$

AFTER INTEGRATING AND ITERATION

$$\text{AFT} = 2065^\circ\text{C} = 2338\text{K}$$