③ $C_6H_{12}O_{6(s)} + 6O_{2(g)} \rightarrow 6CO_{2(g)} + 6H_2O_{(l)}$

Step 1: Hr (general)

$\Delta H_r = \sum nH_{fp} - \sum nH_{fr}$

$= \left[(6mol)(-393.5\frac{kJ}{mol}) + (6mol)(-285.8\frac{kJ}{mol})\right] - \left[(1mol)(-1273.1\frac{kJ}{mol}) + (6mol)(0\frac{kJ}{mol})\right]$

$\Delta H_r = -2802.7\,kJ$

$\Delta H_r = nH_r$

$H_r = \frac{\Delta H_r}{n} = \frac{-2802.7\,kJ}{1\,mol} = -2802.7\,kJ/mol$

Step 2: n (specific)

$18.0g \times \frac{1\,mol}{180.18\,g} = 0.100\,mol\ C_6H_{12}O_6$

Step 3: ΔH_r

$\Delta H_r = nH_r$

$\Delta H_r = (0.100mol)(-2802.7\frac{kJ}{mol})$

$\boxed{\Delta H_r = -280.\,kJ}$

Reaction Enthalpies

- Communicating Enthalpy Changes

(ΔH_r notation, balanced equation, potential energy diagrams)
- Hess's Law
- Enthalpy Changes using Formation Reactions
- Reference Energy State $H_f(O_2) = 0$ kJ/mol
- Thermal Stability
- Multi-Step Energy Calculations

CO_2 vs. H_2O

$H_f = -393.5$ kJ/mol $H_f = -285.8$ kJ/mol

$H_{SD} = 393.5$ kJ/mol $H_{SD} = 285.8$ kJ/mol

(1) $C_3H_{8(g)} + 5O_{2(g)} \longrightarrow 3CO_{2(g)} + 4H_2O_{(g)}$

$H_c = -2.25 \frac{MJ}{mol}$

$\Delta H_c = nH_c$

$\Delta H_c = (1\ mol)(-2.25\ MJ/mol)$

$\Delta H_c = -2.25\ MJ$

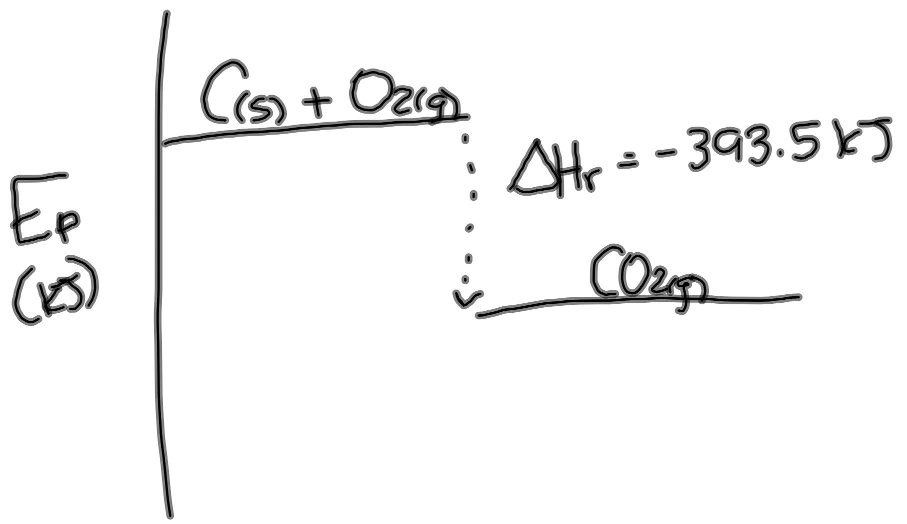
$C_3H_{8(g)} + 5O_{2(g)} \rightarrow 3CO_{2(g)} + 4H_2O_{(g)} + 2.25\ MJ$

$$C_{(s)} + O_{2(g)} \longrightarrow CO_{2(g)}$$

$$CO_{2(g)} \longrightarrow C_{(s)} + O_{2(g)}$$

$$C_{(s)} + O_{2(g)} \longrightarrow CO_{2(g)} \quad \Delta H_r = -393.5\ kJ$$

$$C_{(s)} + O_{2(g)} \longrightarrow CO_{2(g)} + 393.5\ kJ$$



Review Worksheet