

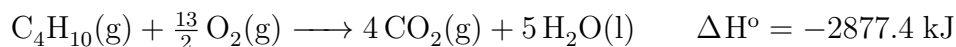
COMBINATION PROBLEM 2



$$\Delta H^\circ = [4\Delta H^\circ_{\text{CO}_2(\text{g})} + 5\Delta H^\circ_{\text{H}_2\text{O}(\text{l})}] - [\Delta H^\circ_{\text{C}_4\text{H}_{10}(\text{g})} + \frac{13}{2}\Delta H^\circ_{\text{O}_2(\text{g})}]$$

$$\Delta H^\circ = [4(-393.5 \text{ kJ}) + 5(-285.8 \text{ kJ})] - [-125.6 \text{ kJ} + \frac{13}{2}(0)]$$

$$\Delta H^\circ = -2877.4 \text{ kJ}$$



$$Q = -\Delta H$$

$$Q = 2877.4 \text{ kJ/mol C}_4\text{H}_{10}$$

$$25.00 \text{ g C}_4\text{H}_{10} \times \frac{1 \text{ mol C}_4\text{H}_{10}}{58.14 \text{ g C}_4\text{H}_{10}} \times \frac{2877.4 \text{ kJ}}{1 \text{ mol C}_4\text{H}_{10}} \times \frac{1000 \text{ J}}{1 \text{ kJ}} = 1237272 \text{ J}$$

$$\Delta T = \frac{Q}{mc}$$

$$\Delta T = \frac{1237272 \text{ J}}{50\,000 \text{ g} \times 4.184 \frac{\text{J}}{\text{g}^\circ\text{C}}}$$

$$\Delta T = 5.914 \text{ }^\circ\text{C}$$