

COMBINATION PROBLEM 7



$$Q = mc\Delta T$$

$$Q = 50\,000 \text{ g} \times 4.184 \frac{\text{J}}{\text{g}^\circ\text{C}} \times 11.469^\circ\text{C}$$

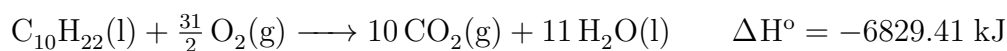
$$Q = 2399314.8 \text{ J}$$

$$Q = 2399.31 \text{ kJ}$$

$$\frac{2399.31 \text{ kJ}}{50 \text{ g C}_{10}\text{H}_{22}} \times \frac{142.32 \text{ g C}_{10}\text{H}_{22}}{1 \text{ mol C}_{10}\text{H}_{22}} = \frac{6829.41 \text{ kJ}}{1 \text{ mol C}_{10}\text{H}_{22}}$$

$$\Delta H = -Q$$

$$\Delta H = -6829.41 \text{ kJ/1 mol C}_{10}\text{H}_{22}$$



$$\begin{aligned} \Delta H^\circ &= [10\Delta H_{\text{CO}_2(\text{g})}^\circ + 11\Delta H_{\text{H}_2\text{O}(\text{l})}^\circ] - [\Delta H_{\text{C}_{10}\text{H}_{22}(\text{g})}^\circ + \frac{31}{2}\Delta H_{\text{O}_2(\text{g})}^\circ] \\ -6829.41 \text{ kJ} &= [10(-393.5 \text{ kJ}) + 11(-285.8 \text{ kJ})] - [\Delta H_{\text{C}_{10}\text{H}_{22}}^\circ + \frac{31}{2}(0)] \end{aligned}$$

$$\Delta H_{\text{C}_{10}\text{H}_{22}(\text{g})}^\circ = -7078.8 \text{ kJ} + 6829.41 \text{ kJ}$$

$$\Delta H_{\text{C}_{10}\text{H}_{22}(\text{g})}^\circ = -249.39 \text{ kJ}$$