

Practice – Heats of Formation

1. Calculate ΔH_f° (kJ) for the following reaction from the listed standard enthalpies of formation:



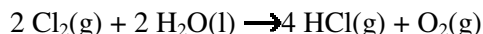
$$\Delta H_f^\circ \text{CO(g)} = -110.5 \text{ kJ}$$

$$\Delta H_f^\circ \text{NH}_3\text{(g)} = -46.1 \text{ kJ}$$

$$\Delta H_f^\circ \text{HCN(g)} = +135.1 \text{ kJ}$$

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

2. Use the given standard enthalpies of formation to determine the heat of reaction of the following reaction:



$$\Delta H_f^\circ \text{H}_2\text{O(l)} = -285.8 \text{ kJ/mole}$$

$$\Delta H_f^\circ \text{HCl(g)} = -92.3 \text{ kJ/mole}$$

3. Use the given standard enthalpies of formation to determine the heat of reaction of the following reaction:

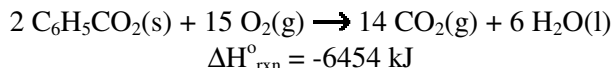


$$\Delta H_f^\circ \text{Ag}_2\text{S(s)} = -32.6 \text{ kJ/mole}$$

$$\Delta H_f^\circ \text{H}_2\text{S(g)} = -20.6 \text{ kJ/mole}$$

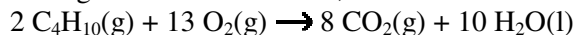
$$\Delta H_f^\circ \text{H}_2\text{O(l)} = -285.8 \text{ kJ/mole}$$

4. The heats of formation of $\text{CO}_2\text{(g)}$ and $\text{H}_2\text{O(l)}$ are -394 kJ/mole and -285.8 kJ/mole respectively. Using the data for the following combustion reaction, calculate the heat of formation of $\text{C}_6\text{H}_5\text{CO}_2\text{H(s)}$.



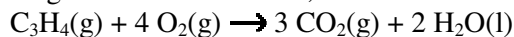
$$\Delta H_{\text{rxn}}^\circ = -6454 \text{ kJ}$$

5. The heats of formation of $\text{CO}_2\text{(g)}$ and $\text{H}_2\text{O(l)}$ are -394 kJ/mole and -285.8 kJ/mole respectively. Using the data for the following combustion reaction, calculate the heat of formation of $\text{C}_4\text{H}_{10}\text{(g)}$.



$$\Delta H_{\text{rxn}}^\circ = -5756.1 \text{ kJ}$$

6. The heats of formation of $\text{CO}_2\text{(g)}$ and $\text{H}_2\text{O(l)}$ are -394 kJ/mole and -285.8 kJ/mole respectively. Using the data for the following combustion reaction, calculate the heat of formation of $\text{C}_3\text{H}_4\text{(g)}$.



$$\Delta H_{\text{rxn}}^\circ = -1939.1 \text{ kJ}$$