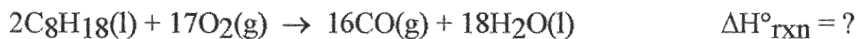
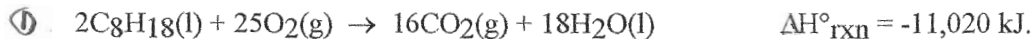


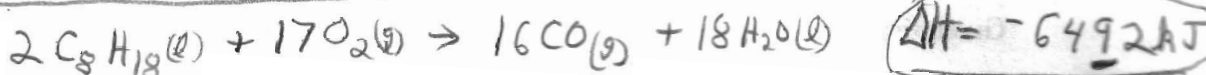
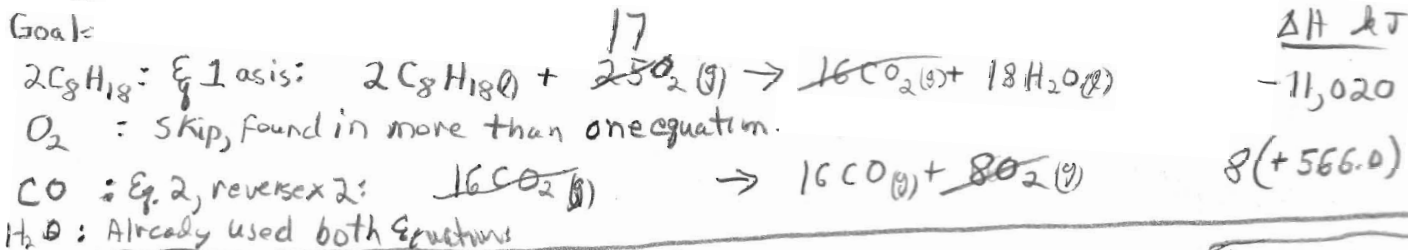
1. Calculate the enthalpy change for the reaction:



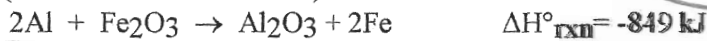
Given:



Goal:



2. How much heat is given off to the surroundings when 9.0 g of aluminum reacts according to the equation? (molar mass of Al = 26.98)

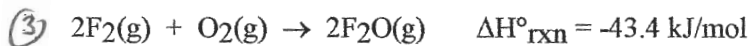
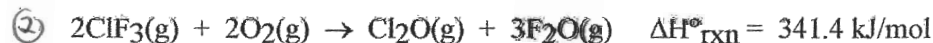
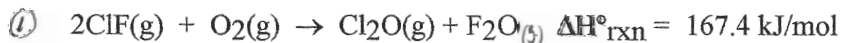


9.0g

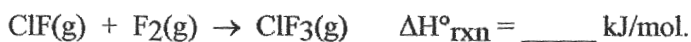
wording makes heat sigless

$$\frac{9.0 \text{ g Al}}{26.98 \text{ g/mol}} \times \frac{849 \text{ kJ}}{2 \text{ mol Al}} = 142 \text{ kJ}$$

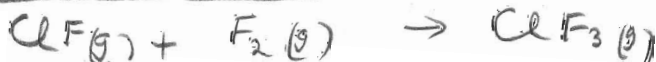
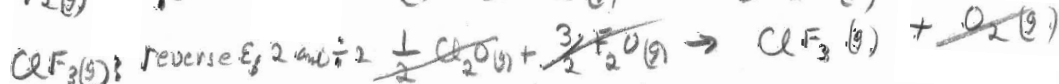
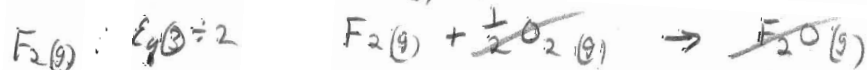
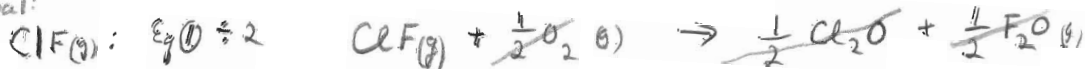
3. At 25°C, the following heats of reaction are known:



At the same temperature, use Hess's law to calculate ΔH°_{rxn} for the reaction:



Goal:



$$\begin{array}{r} \Delta H \text{ kJ} \\ 167.4 \\ \hline 2 \\ -43.4 \\ \hline 2 \\ -341.4 \\ \hline 2 \\ \hline -108.7 \text{ kJ/mol} \end{array}$$

~~Over~~

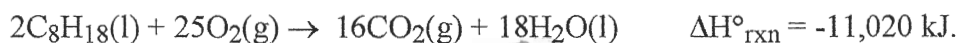
Key

4. How many degrees of temperature rise will occur when a 25.0 g block of aluminum absorbs 10 kJ of heat? The specific heat of Al is 0.900 J/g·°C.

$$\frac{10 \times 10^3 \text{ J}}{0.900 \text{ J/g} \cdot \text{°C} \times 25.0 \text{ g}} = 444 \text{ °C}$$

400 °C

5. Octane (C₈H₁₈) undergoes combustion according to the following thermochemical equation:



Given that:

$$\Delta H^\circ_f[\text{CO}_2(\text{g})] = -393.5 \text{ kJ/mol}$$

$$\Delta H^\circ_f[\text{H}_2\text{O}(\text{l})] = -285.8 \text{ kJ/mol}$$

Calculate the enthalpy of formation of 1 mole of octane.

$$\Delta H_{\text{rxn}} = \sum \Delta H_{\text{products}} - \sum \Delta H_{\text{reactants}}$$

→ value

$$-11,020 = \Delta H_{\text{rxn}} = [16(-393.5) + 18(-285.8)] - [2(x) + 25(0)] = -11,020$$
$$x = -210.2 \text{ kJ} = \Delta H^\circ_f \text{ C}_8\text{H}_{18}(\text{l})$$

6. Copper metal has a specific heat of 0.385 J/g·°C. Calculate the amount of heat required to raise the temperature of 22.8 g of Cu from 20.0°C to 875°C.

$$\frac{0.385 \text{ J}}{\text{g} \cdot \text{°C}} \times 22.8 \text{ g} \times (875 - 20.0) \text{ °C} = 7505 \text{ J}$$

7510 J