Quiz 6.3 – Enthalpy

Name: Key

Question 1 (2 points)

A bomb calorimeter has a calibrated heat capacity of $C_{cal} = 2.673 \frac{kJ}{°C}$

1.25 g of sucrose ($C_{12}H_{22}O_{11}$) are burned in the calorimeter and the temperature rises by 7.71 $°C$

Calculate ΔH_{rxn} for the combustion of sucrose

$$1.25\,g\ C_{12}H_{22}O_{11} \left| \frac{1\ mol\ C_{12}H_{22}O_{11}}{342.30\,g\ C_{12}H_{22}O_{11}} \right. = 0.003652\ moles\ C_{12}H_{22}O_{11}$$

$$\Delta H_{rxn} = \frac{-C\Delta T}{n} = \frac{-2.673\ kJ/°C \cdot 7.71°C}{0.003652\ moles} = 5,640\ kJ/mol$$

Question 2 (3 points)

Consider the reaction: $H_2S(g) + 2\,O_2(g) \longrightarrow SO_3(g) + H_2O(l)$ $\quad \Delta H_{rxn} = -207 \frac{kJ}{mol}$

If 5.2 g of H_2S are reacted with excess O_2, how much heat will be released?

$$5.2\,g\ H_2S \left| \frac{1\ mol\ H_2S}{34.08\,g\ H_2S} \right| \frac{-207\ kJ}{1\ mol\ H_2S} = -31.6\ kJ$$

31.6 kJ released