Quiz 6.4 – Hess's Law

Name: Key

Question 1 (2 points)

Consider the reaction: $H_2S(g) + 2\,O_2(g) \longrightarrow H_2SO_4(l)$ $\quad \Delta H_{rxn} = -235.5\ \frac{kJ}{mol}$

Find ΔH_{rxn} for the reaction: $2\,H_2SO_4(l) \longrightarrow 2\,H_2S(g) + 4\,O_2(g)$

$\Delta H_{rxn} = -2 \cdot \left(-235.5\ \frac{kJ}{mol}\right) = 471.0\ \frac{kJ}{mol}$

Question 2 (3 points)

Find ΔH_{rxn} for reaction (★) using reactions (A), (B), and (C)

(★) $N_2(g) + 2\,O_2(g) \longrightarrow 2\,NO_2(g)$ $\quad \Delta H_{rxn} = ?$

(A) $N_2(g) + 3\,H_2(g) \longrightarrow 2\,NH_3(g)$ $\quad \Delta H_{rxn} = -115\ \frac{kJ}{mol}$

(B) $2\,NH_3(g) + 4\,H_2O(l) \longrightarrow 2\,NO_2(g) + 7\,H_2(g)$ $\quad \Delta H_{rxn} = -142.5\ \frac{kJ}{mol}$

(C) $2\,H_2O(l) \longrightarrow 2\,H_2(g) + O_2(g)$ $\quad \Delta H_{rxn} = -87.4\ \frac{kJ}{mol}$

★ = A + B − 2C

$\Delta H_{rxn} = -115\ kJ/mol - 142.5\ kJ/mol - 2 \cdot (-87.4\ kJ/mol) = -82.7\ kJ/mol$