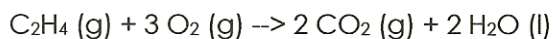
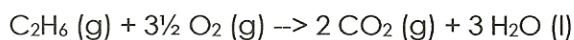


Hess's Law Worksheet

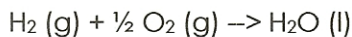
1. Calculate ΔH for the reaction: $C_2H_4(g) + H_2(g) \rightarrow C_2H_6(g)$, from the following data.



$$\Delta H = -1411. \text{ kJ}$$



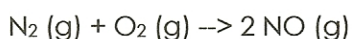
$$\Delta H = -1560. \text{ kJ reverse}$$



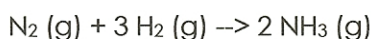
$$\Delta H = -285.8 \text{ kJ}$$

$$-1411. + 1560. - 285.8 \quad \text{ans: } \Delta H = -136 \text{ kJ}$$

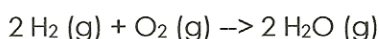
2. Calculate ΔH for the reaction $4 NH_3(g) + 5 O_2(g) \rightarrow 4 NO(g) + 6 H_2O(g)$, from the following data.



$$\Delta H = +180.5 \text{ kJ} \times 2$$



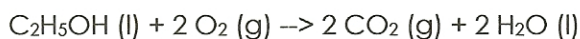
$$\Delta H = -91.8 \text{ kJ} \times 2 \text{ (reverse)}$$



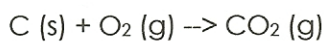
$$\Delta H = -483.6 \text{ kJ} \times 3$$

$$361 + 183.6 - 1450.8 \quad \text{ans: } \Delta H = -906.2 \text{ kJ}$$

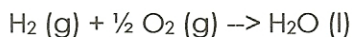
3. Find ΔH° for the reaction $2H_2(g) + 2C(s) + O_2(g) \rightarrow C_2H_5OH(l)$, using the following thermochemical data.



$$\Delta H = -875. \text{ kJ reverse}$$



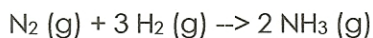
$$\Delta H = -394.51 \text{ kJ} \times 2$$



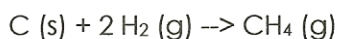
$$\Delta H = -285.8 \text{ kJ} \times 2$$

$$875. - 789.02 - 571.6 = \quad \text{ans. } \Delta H = -486 \text{ kJ}$$

4. Calculate ΔH for the reaction $CH_4(g) + NH_3(g) \rightarrow HCN(g) + 3 H_2(g)$, given:



$$\Delta H = -91.8 \text{ kJ}$$



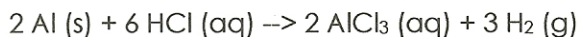
$$\Delta H = -74.9 \text{ kJ}$$



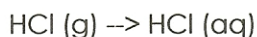
$$\Delta H = +270.3 \text{ kJ}$$

$$45.9 + 74.9 + 135.15 \quad \Delta H = 255.9 \text{ kJ (or } 256.0 \text{ kJ)}$$

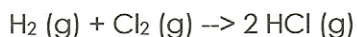
5. Calculate ΔH for the reaction $2 Al(s) + 3 Cl_2(g) \rightarrow 2 AlCl_3(s)$ from the data.



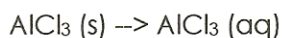
$$\Delta H = -1049. \text{ kJ}$$



$$\Delta H = -74.8 \text{ kJ} \times 6$$



$$\Delta H = -1845. \text{ kJ} \times 3$$



$$\Delta H = -323. \text{ kJ} \times 2 \text{ (reverse)}$$

depends on rounding

$$-1049 - 448.8 - 5535 + 646$$

$$\text{ans. } \Delta H = -6387 \text{ kJ}$$