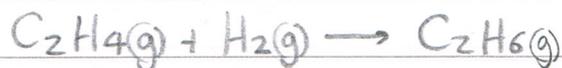


Hess Law

① Calculate the standard enthalpy change for the reaction:



given the following standard enthalpy changes of combustion:

$$\Delta H_c^\ominus(\text{C}_2\text{H}_4(\text{g})) = -1411 \text{ kJ mol}^{-1}$$

$$\Delta H_c^\ominus(\text{H}_2(\text{g})) = -286 \text{ kJ mol}^{-1}$$

$$\Delta H_c^\ominus(\text{C}_2\text{H}_6(\text{g})) = -1560 \text{ kJ mol}^{-1}$$

② Calculate the enthalpy change of combustion of ethene, C_2H_4 , given the following enthalpy changes of formation:

$$\Delta H_f^\ominus(C_2H_4(g)) = +52 \text{ kJmol}^{-1}$$

$$\Delta H_f^\ominus(CO_2(g)) = -394 \text{ kJmol}^{-1}$$

$$\Delta H_f^\ominus(H_2O(l)) = -286 \text{ kJmol}^{-1}$$

③ Calculate the standard enthalpy change of formation of methane from the following enthalpy changes of combustion:

$$\Delta H_c^\ominus = (\text{CH}_4(\text{g})) = -890 \text{ kJmol}^{-1}$$

$$\Delta H_c^\ominus = (\text{H}_2(\text{g})) = -286 \text{ kJmol}^{-1}$$

$$\Delta H_c^\ominus = (\text{C}(\text{s})) = -394 \text{ kJmol}^{-1}$$

④ Calculate the enthalpy change for the reaction:



$$\Delta H^{\circ}_f(\text{CaCO}_3(\text{s})) = -1207 \text{ kJmol}^{-1}$$

$$\Delta H^{\circ}_f(\text{CaO}(\text{s})) = -635 \text{ kJmol}^{-1}$$

$$\Delta H^{\circ}_f(\text{CO}_2(\text{g})) = -394 \text{ kJmol}^{-1}$$

⑤ Calculate the standard enthalpy change of formation of solid ammonium chloride, NH_4Cl , using the following data:

$$\Delta H_f^\circ(\text{NH}_3(g)) = -46.1 \text{ kJmol}^{-1} \quad \Delta H_f^\circ = -176.0 \text{ kJmol}^{-1}$$

$$\Delta H_f^\circ(\text{HCl}(g)) = -92.3 \text{ kJmol}^{-1}$$

