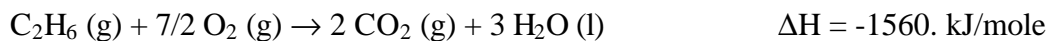
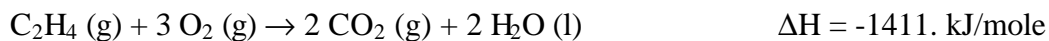
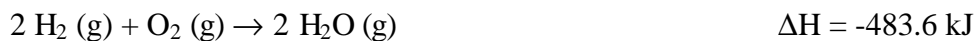


**Chemistry 120**  
**Hess's Law Worksheet**

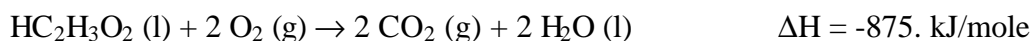
1. Calculate  $\Delta H$  for the reaction  $\text{C}_2\text{H}_4 (\text{g}) + \text{H}_2 (\text{g}) \rightarrow \text{C}_2\text{H}_6 (\text{g})$ , from the following data.



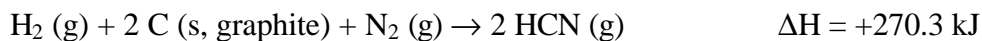
2. Calculate  $\Delta H$  for the reaction  $4 \text{NH}_3 (\text{g}) + 5 \text{O}_2 (\text{g}) \rightarrow 4 \text{NO} (\text{g}) + 6 \text{H}_2\text{O} (\text{g})$ , from the following data.



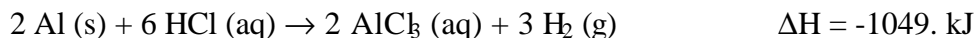
3. Find  $\Delta H_f^0$  for acetic acid,  $\text{HC}_2\text{H}_3\text{O}_2$ , using the following thermochemical data.



4. Calculate  $\Delta H$  for the reaction  $\text{CH}_4 (\text{g}) + \text{NH}_3 (\text{g}) \rightarrow \text{HCN} (\text{g}) + 3 \text{H}_2 (\text{g})$ , from the reactions.



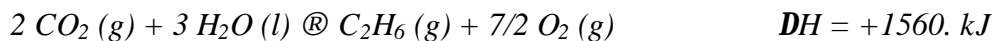
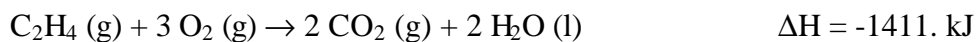
5. Calculate  $\Delta H$  for the reaction  $2 \text{Al} (\text{s}) + 3 \text{Cl}_2 (\text{g}) \rightarrow 2 \text{AlCl}_3 (\text{s})$  from the following data.



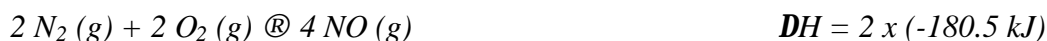
## Solutions

Reactions that were reversed or multiplied by a constant are shown in italics.

### 1. $\Delta H = -137. \text{ kJ}$

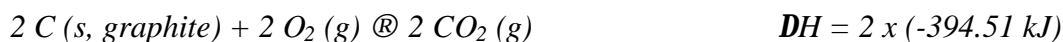
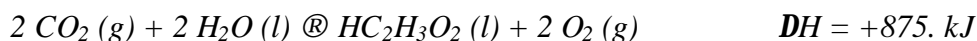


### 2. $\Delta H = -1628. \text{ kJ}$

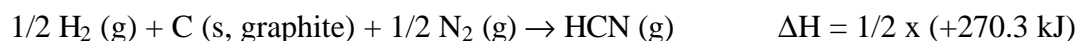
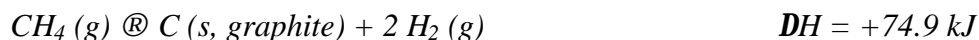


### 3. $\Delta H_f^\circ = -486. \text{ kJ}$

Reaction defining  $\Delta H_f^\circ$  ( $\text{HC}_2\text{H}_3\text{O}_2$ ) is:  $2 \text{C}(\text{s, graphite}) + 2 \text{H}_2 (\text{g}) + \text{O}_2 (\text{g}) \rightarrow \text{HC}_2\text{H}_3\text{O}_2 (\text{l})$ .



### 4. $\Delta H = +256.0 \text{ kJ}$



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

