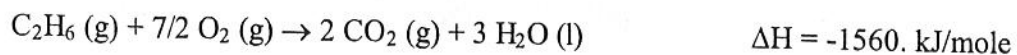
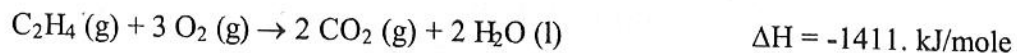


Chemistry 120
Hess's Law Worksheet

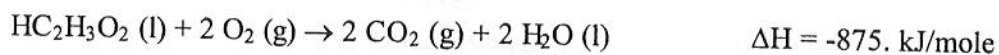
1. Calculate ΔH for the reaction $\text{C}_2\text{H}_4(\text{g}) + \text{H}_2(\text{g}) \rightarrow \text{C}_2\text{H}_6(\text{g})$, from the following data.



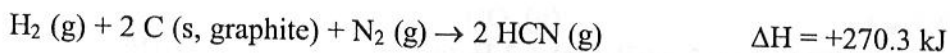
2. Calculate ΔH for the reaction $4 \text{NH}_3(\text{g}) + 5 \text{O}_2(\text{g}) \rightarrow 4 \text{NO}(\text{g}) + 6 \text{H}_2\text{O}(\text{g})$, from the following data.



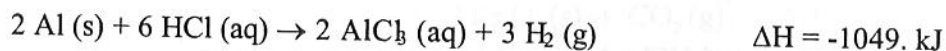
3. Find ΔH_f° for acetic acid, $\text{HC}_2\text{H}_3\text{O}_2$, using the following thermochemical data.



4. Calculate ΔH 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.



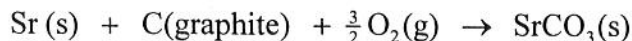
5. Calculate ΔH for the reaction $2 \text{Al}(\text{s}) + 3 \text{Cl}_2(\text{g}) \rightarrow 2 \text{AlCl}_3(\text{s})$ from the following data.



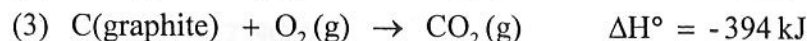
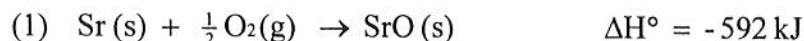
Here are some additional Hess' Law problems:

Ref. Moore, J.W., Stanitski, C.L., and Jurs, P. C., Chemistry: The Molecular Science, 2nd ed., Thomson, 2005.

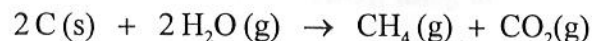
1. Calculate the standard enthalpy change, ΔH° , for the formation of 1 mol of strontium carbonate (the material that gives the red color in fireworks) from its elements.



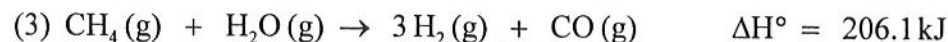
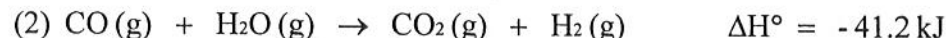
The information available is



2. The combination of coke and steam produces a mixture called coal gas, which can be used as a fuel or as a starting material for other reactions. If we assume coke can be represented by graphite, the equation for the production of coal gas is

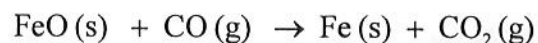


Determine the standard enthalpy change for this reaction from the following standard enthalpies of reaction :

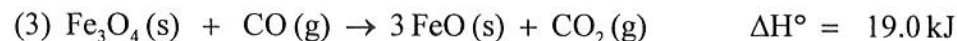
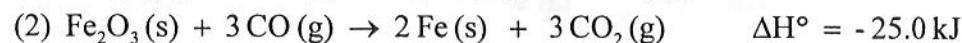
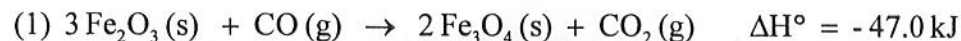


The next one is challenging!

3. One reaction involved in the conversion of iron ore to the metal is



Calculate the standard enthalpy change for this reaction from these reactions of iron oxides with CO :



Answers: 1. - 1220 kJ

2. + 15.3 kJ

3. - 11.0 kJ