

Topic 6 - Energetics

6.6 Hess Law and Enthalpy Cycles

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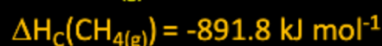
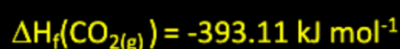
6.6 know Hess's Law and be able to apply it to:

i constructing enthalpy cycles

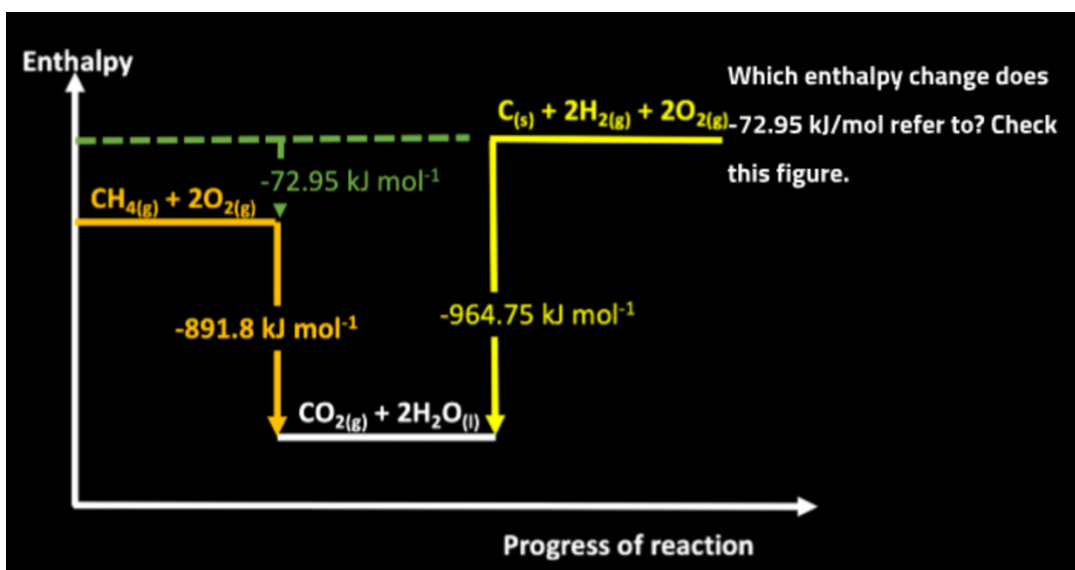
ii calculating enthalpy changes of reaction using data provided, or data selected from a table or obtained from experiments

Can we justify this using our knowledge of Chemistry?

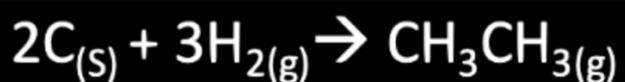
The standard enthalpy change of formation of a compound is the enthalpy change which occurs when one mole of the compound is formed from its elements under standard conditions, and with everything in its standard state.



The standard enthalpy change of combustion of a compound is the enthalpy change which occurs when one mole of the compound is burned completely in oxygen under standard conditions, and with everything in its standard state.



Why is Hess Law important?



What problems could you encounter determining the enthalpy change for this reaction directly?



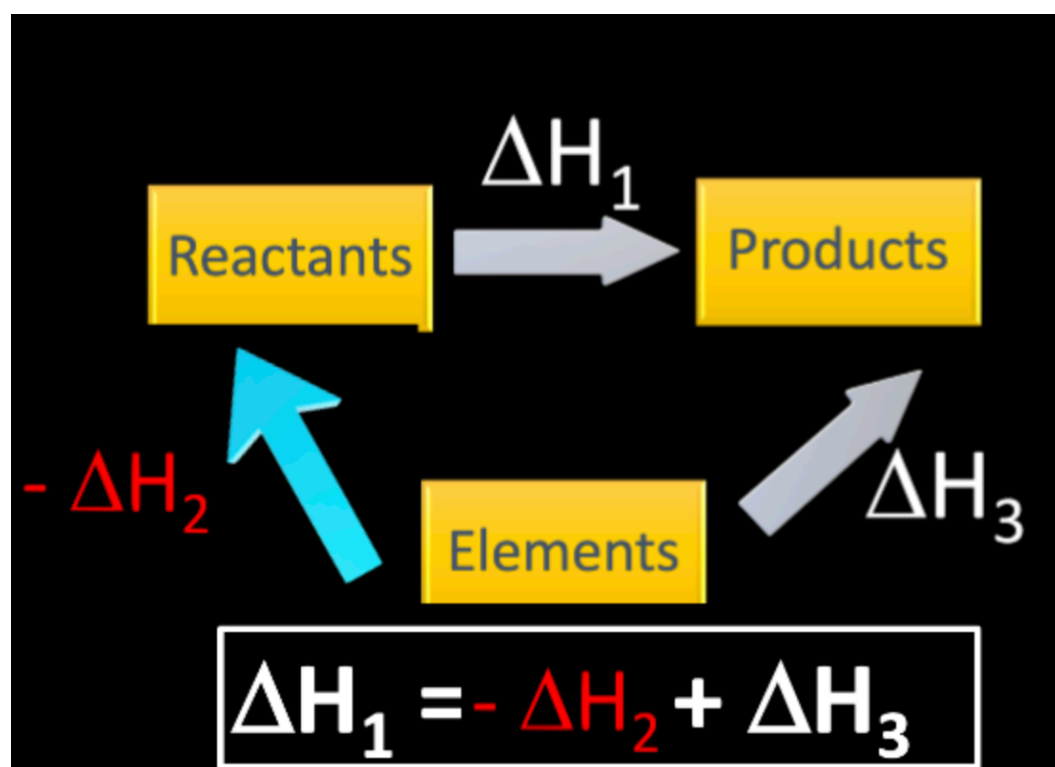
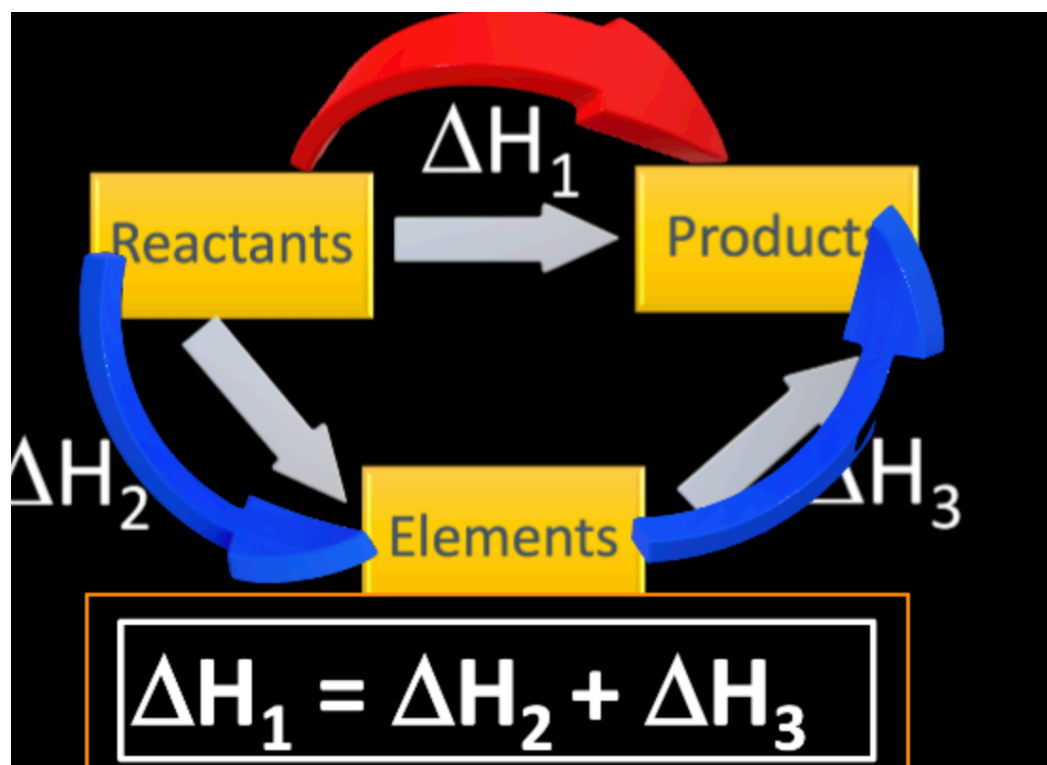
Enthalpy Cycles - Example 1

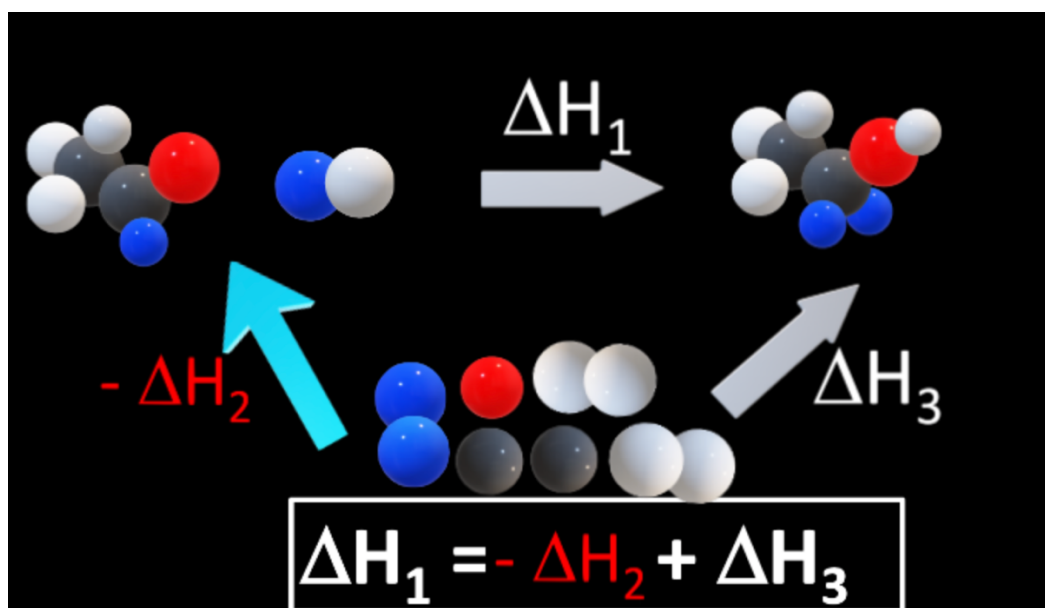
Using the standard enthalpy change of formation data

Elements in
standard states



1 mole of compound in its
standard state



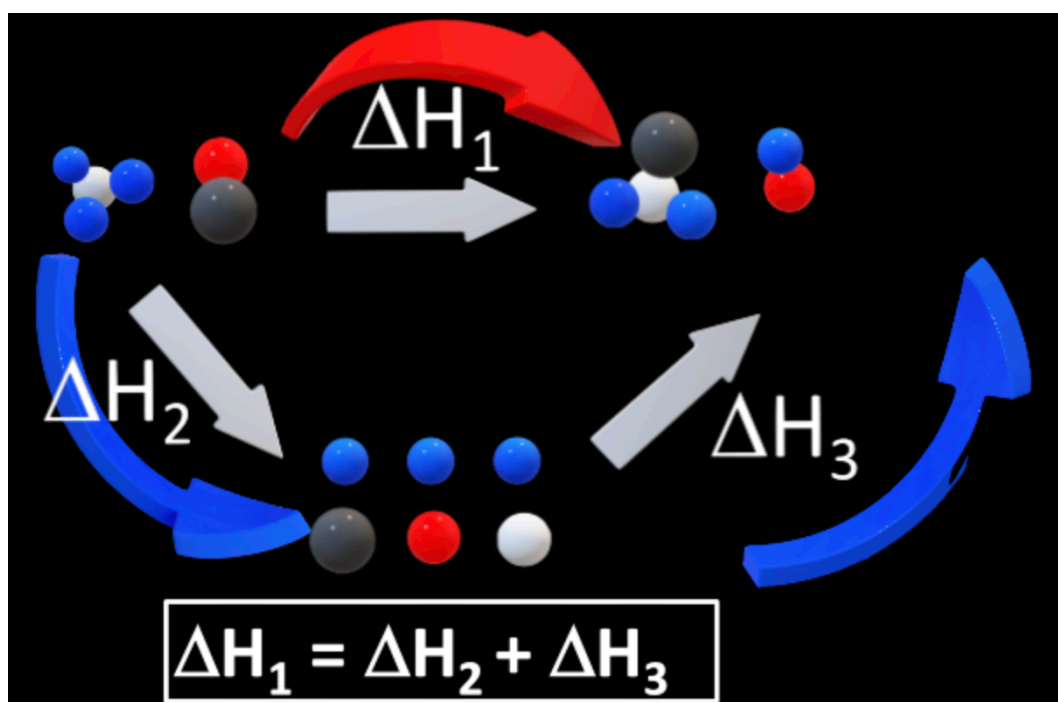
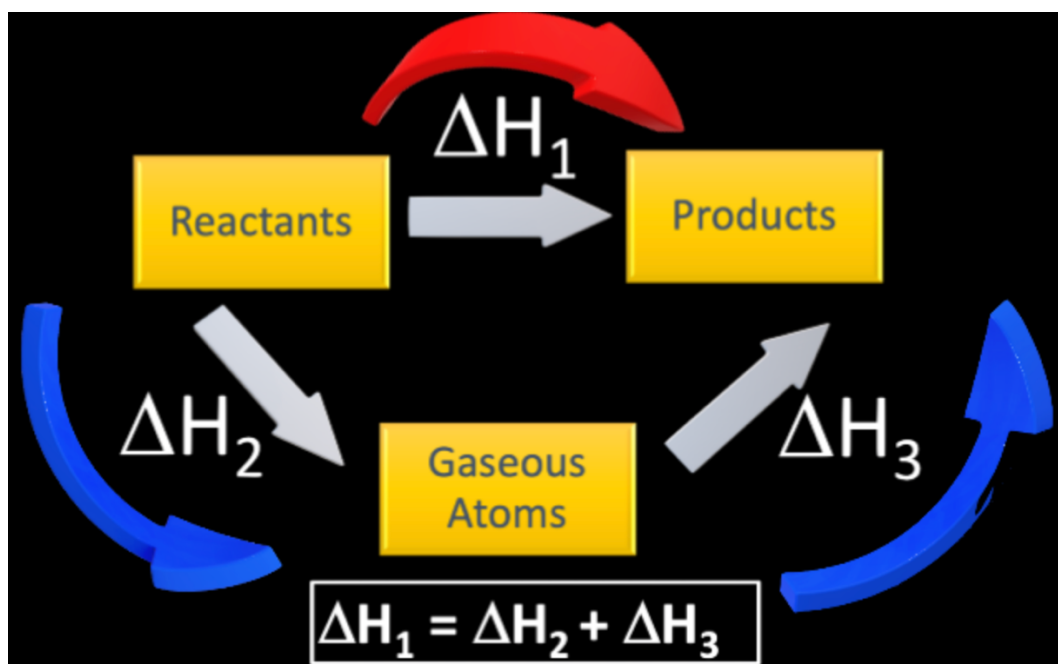


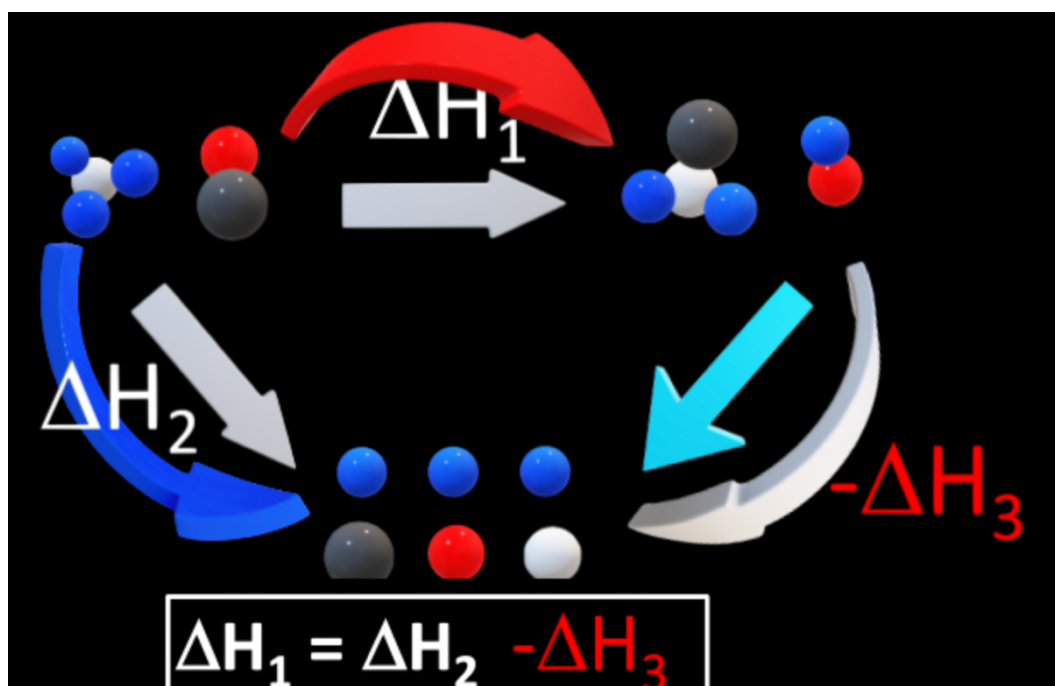
Enthalpy Cycles - Example 2

Using bond dissociation enthalpies

The bond dissociation enthalpy is the energy needed to break one mole of the bond to give separated atoms - everything being in the gas state.



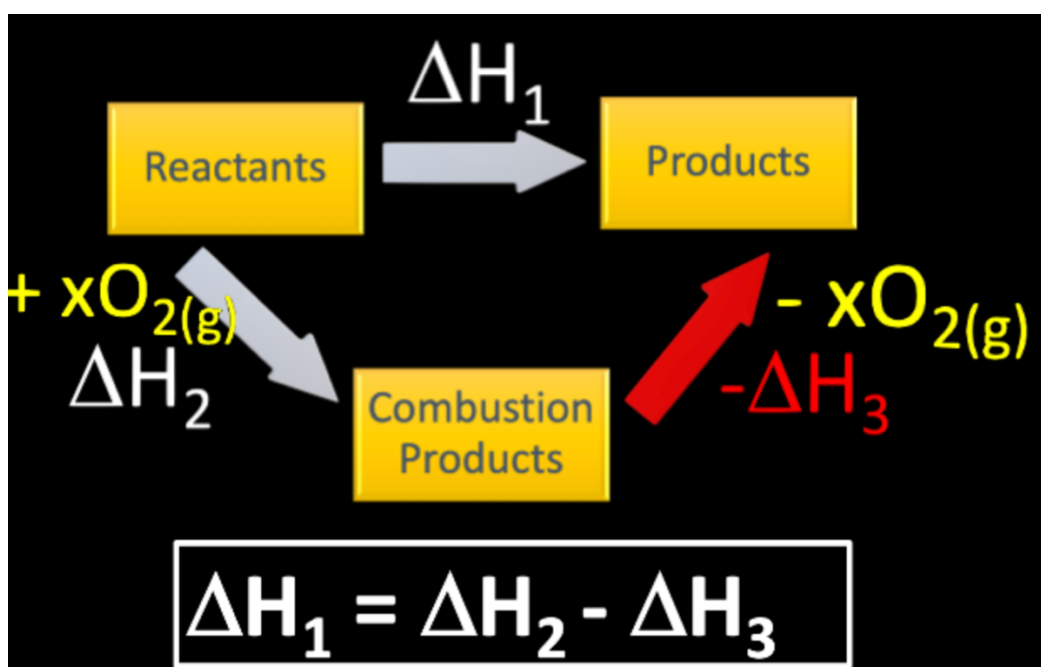
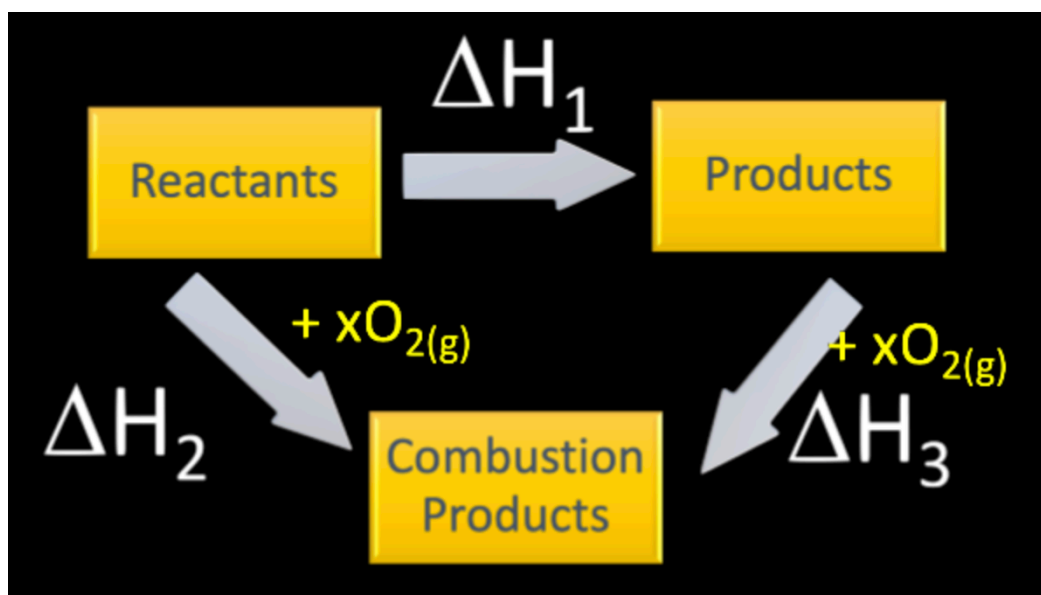


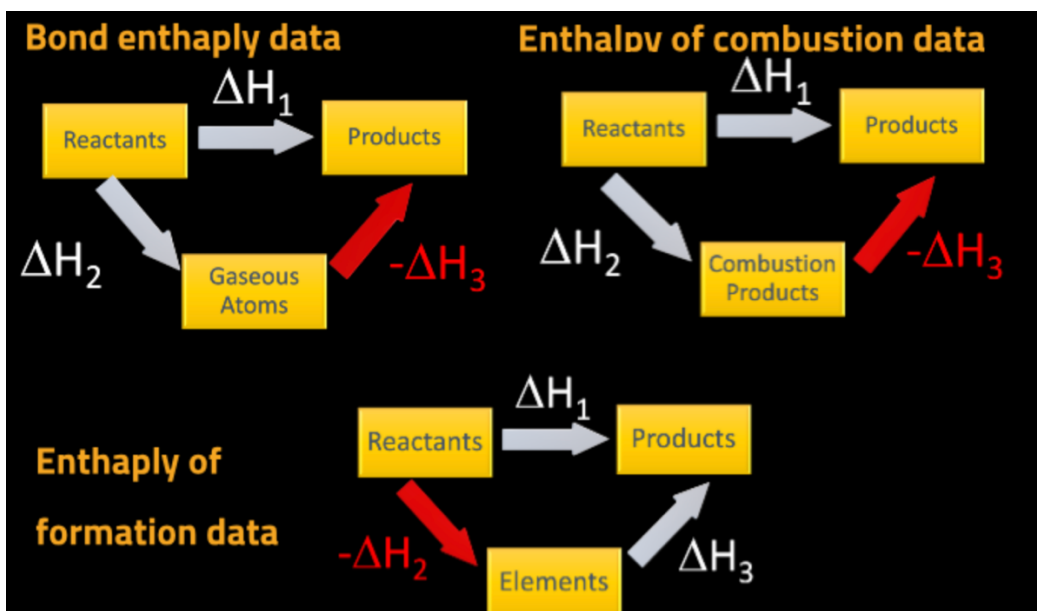
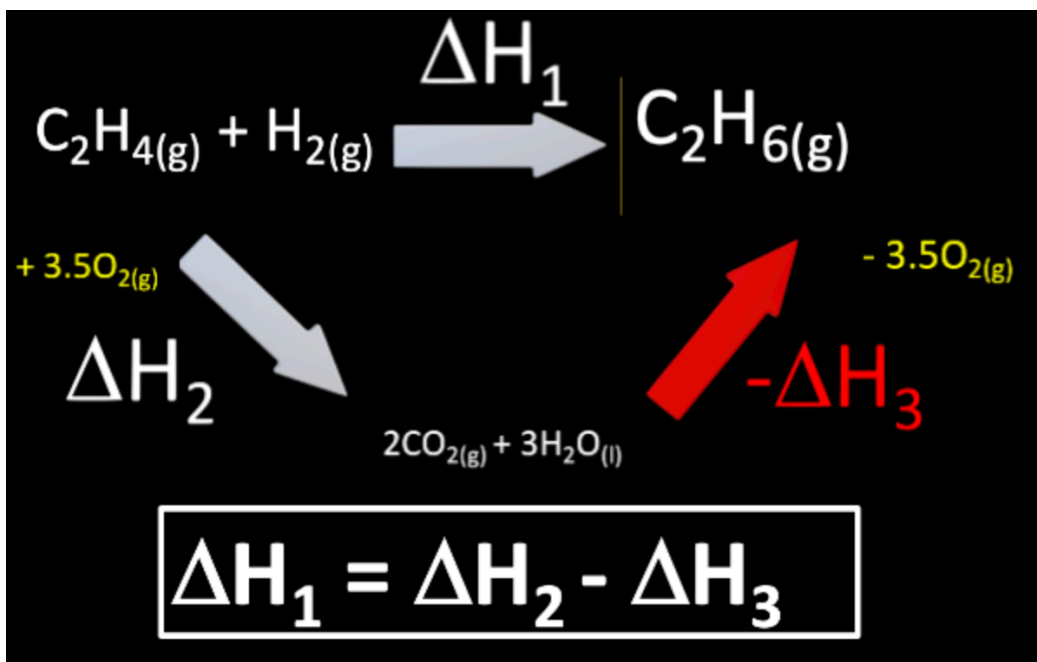


Enthalpy Cycles - Example 3

Using standard enthalpy of combustion

The standard enthalpy change of combustion of a compound is the enthalpy change which occurs when one mole of the compound is burned completely in oxygen under standard conditions, and with everything in its standard state.





Before our next lesson:

- 1) Reflect on the problems you would encounter when determining the enthalpy change for the formation of ethane directly.
- 2) Learn Hess Law
- 3) Consider which enthalpy change -72.95 kJ/mol refers to, and find a value for it from a data book.
- 4) Be prepared to complete examples of Enthalpy cycles.

