

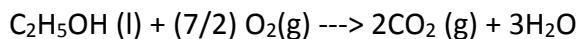
## Answer on Question #59669 – Chemistry | General Chemistry

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.

According to the Hess' Law, equation is usually presented like this:

$$\Delta H^{\circ}\text{comb} = \sum \Delta H^{\circ}\text{f} (\text{products}) - \sum \Delta H^{\circ}\text{f} (\text{reactants})$$

Example:



At first, we sum up all the product enthalpies of formation and then subtract the summed up reactant enthalpies of formation. Like this:

Standard enthalpies of formation (at 25°C, 298K):

$$\text{water}(\text{l}) = -285.8 \text{ kJ/mol}$$

$$\text{carbon dioxide}(\text{g}) = -393.5 \text{ kJ/mol}$$

$$\text{ethanol}(\text{l}) = -277.0 \text{ kJ/mol}$$

$$\Delta H^{\circ}\text{comb} = [ 2 * (-393.5) + 3 * (-286) ] - [ (-278) + (7/2) * (0) ]$$

The boldfaced values are the coefficients and the other ones are the standard enthalpy of formation for the four substances involved. Since oxygen is an element in its standard state, its enthalpy of formation is zero.

Doing the math gives us  $\Delta H^{\circ}\text{comb} = -1367 \text{ kJ/mol}$  of ethyl alcohol.