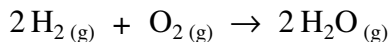


## Problems of Thermochemistry: Bond enthalpies

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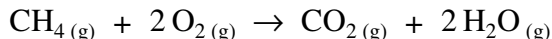
1) Calculate the enthalpy of the following reaction at 25 °C using average bond enthalpies.



Average bond enthalpies (kJ/mol):

$$E(\text{H-H})=436, E(\text{O=O})=498, E(\text{O-H})=463$$

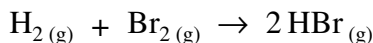
2) Determine the enthalpy of the following reaction at 25 °C using average bond enthalpies.



Average bond enthalpies (kJ/mol):

$$E(\text{C-H})=413, E(\text{O=O})=498, E(\text{C=O})=804, E(\text{O-H})=463$$

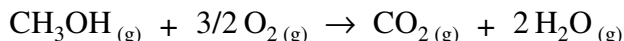
3) Find the enthalpy of the following reaction at 25 °C using average bond enthalpies.



Average bond enthalpies (kJ/mol):

$$E(\text{H-H})=436, E(\text{Br-Br})=193, E(\text{H-Br})=366$$

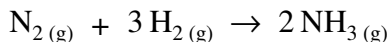
4) Find the enthalpy of the following reaction at 25 °C using average bond enthalpies.



Average bond enthalpies (kJ/mol):

$$E(\text{C-O})=352, E(\text{C-H})=413, E(\text{O=O})=498, E(\text{C=O})=804, E(\text{O-H})=463$$

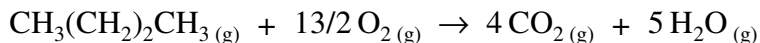
5) Determine the enthalpy of the following reaction at 25 °C using average bond enthalpies.



Average bond enthalpies (kJ/mol):

$$E(\text{N}\equiv\text{N})=945, E(\text{H-H})=436, E(\text{N-H})=391$$

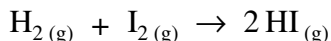
6) Find the enthalpy of the following reaction at 25 °C using average bond enthalpies.



Average bond enthalpies (kJ/mol):

$$E(\text{C-C})=347, E(\text{C-H})=413, E(\text{O=O})=498, E(\text{C=O})=804, E(\text{O-H})=463$$

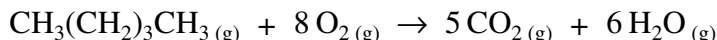
7) Find the enthalpy of the following reaction at 25 °C using average bond enthalpies.



Average bond enthalpies (kJ/mol):

$$E(\text{H-H})=436, E(\text{I-I})=151, E(\text{H-I})=298$$

8) Determine the enthalpy of the following reaction at 25 °C using average bond enthalpies.



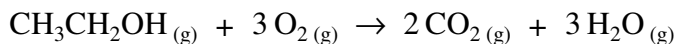
Average bond enthalpies (kJ/mol):

$$E(\text{C-C})=347, E(\text{C-H})=413, E(\text{O=O})=498, E(\text{C=O})=804, E(\text{O-H})=463$$

**Problems of Thermochemistry: Bond enthalpies**


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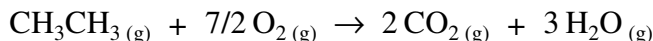
9) Calculate the enthalpy of the following reaction at 25 °C using average bond enthalpies.



Average bond enthalpies (kJ/mol):

$$E(\text{C}-\text{C})=347, E(\text{C}-\text{O})=352, E(\text{C}-\text{H})=413, E(\text{O}=\text{O})=498, E(\text{C}=\text{O})=804, E(\text{O}-\text{H})=463$$

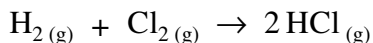
10) Find the enthalpy of the following reaction at 25 °C using average bond enthalpies.



Average bond enthalpies (kJ/mol):

$$E(\text{C}-\text{C})=347, E(\text{C}-\text{H})=413, E(\text{O}=\text{O})=498, E(\text{C}=\text{O})=804, E(\text{O}-\text{H})=463$$

11) Determine the enthalpy of the following reaction at 25 °C using average bond enthalpies.



Average bond enthalpies (kJ/mol):

$$E(\text{H}-\text{H})=436, E(\text{Cl}-\text{Cl})=243, E(\text{H}-\text{Cl})=432$$

**Answers:**

- 1) -482 kJ.
- 2) -812 kJ.
- 3) -103 kJ.
- 4) -659 kJ.
- 5) -93 kJ.
- 6) -2654 kJ.
- 7) -9 kJ.
- 8) -3268 kJ.
- 9) -1273 kJ.
- 10) -1426 kJ.
- 11) -185 kJ.