Thermochemical Equations

SCC283

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1. **Heat of Combustion for Propane:**
   The combustion of propane, C_3H_8, is represented by the following thermochemical equation:
   $$C_3H_8(g) + 5O_2(g) \rightarrow 3CO_2(g) + 4H_2O(l) \quad \Delta H = -2219\,\text{kJ}$$
   (a) How much heat is released when 2.50 moles of propane are combusted?
   (b) What is the heat released when 100.0 g of propane are burned?

2. **Heat of Combustion for Methane:**
   The combustion of methane, CH_4, is represented by the following thermochemical equation:
   $$CH_4(g) + 2O_2(g) \rightarrow CO_2(g) + 2H_2O(l) \quad \Delta H = -890.3\,\text{kJ}$$
   (a) How much heat is released when 3.00 moles of methane are combusted?
   (b) What is the heat released when 48.0 g of methane are burned?

3. **Heat of Combustion for Ethanol:**
   The combustion of ethanol, C_2H_5OH, is represented by the following thermochemical equation:
   $$C_2H_5OH(l) + 3O_2(g) \rightarrow 2CO_2(g) + 3H_2O(l) \quad \Delta H = -1367\,\text{kJ}$$
   (a) How much heat is released when 0.750 moles of ethanol are combusted?
   (b) What is the heat released when 46.0 g of ethanol are burned?

4. **Heat of Combustion for Hydrogen:**
   The combustion of hydrogen, H_2, is represented by the following thermochemical equation:
   $$2H_2(g) + O_2(g) \rightarrow 2H_2O(l) \quad \Delta H = -571.6\,\text{kJ}$$
   (a) How much heat is released when 5.00 moles of hydrogen are combusted?
   (b) What is the heat released when 10.0 g of hydrogen are burned?

5. **Heat of Combustion for Octane:**
   The combustion of octane, C_8H_{18}, is represented by the following thermochemical equation:
   $$2C_8H_{18}(l) + 25O_2(g) \rightarrow 16CO_2(g) + 18H_2O(l) \quad \Delta H = -10900\,\text{kJ}$$
   (a) How much heat is released when 0.400 moles of octane are combusted?
   (b) What is the heat released when 114 g of octane are burned?