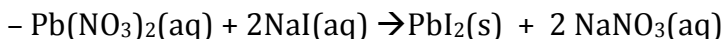


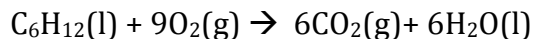
Thermodynamics Unit - Quantifying Heat (Group Problems)

1. How much heat, in joules, is required to raise the temperature of 205 g of water from 21.1 °C to 91.4 °C?

2. A constant pressure (coffee cup type) calorimeter having a heat capacity of 472 J*°C⁻¹ is used to measure the heat evolved when the following aqueous solutions, both initially at 22.6 °C, are mixed: 100 g of solution containing 6.62 g of lead(II) nitrate, Pb(NO₃)₂, and 100. g of solution containing 6.00 g of sodium iodide, NaI. The final temperature is 24.2°C. Assume that the specific heat of the mixture is the same as that for water, 4.184 J*g⁻¹* °C⁻¹. Calculate the amount of heat evolved in the reaction. Calculate the ΔH of the reaction as written.



3. The thermo chemical equation for the combustion of cyclohexane



$$\Delta H = -3920 \text{ kJ/mol at } 298 \text{ K.}$$

What is the change in internal energy for the combustion of 1.00 mol C₆H₁₂(l) at 298K?

4. Compare the energy of combustion of H₂ to CH₄ using a bomb calorimeter with a heat capacity of 11.3 kJ/°C. When a 1.50 g sample of methane gas was burned with excess oxygen in the calorimeter, the T increased by 7.3 °C. When a 1.15 g sample of hydrogen gas was burned with excess oxygen, the temperature increase was 14.3 °C. Calculate the energy of combustion (per gram) for hydrogen and methane.