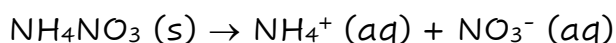


Calorimetry

1. Octane, C_8H_{18} , has a specific heat of $2.22 \text{ J}/(\text{g}\cdot\text{K})$. What quantity of heat, in kJ, is required to raise the temperature of 125.00 g of octane from $15.0 \text{ }^\circ\text{C}$ to $28.0 \text{ }^\circ\text{C}$?

2. Consider the equation below:



A 4.25 g sample of solid ammonium nitrate is dissolved in 60.0 g of water in a coffee cup calorimeter. The temperature decreases from $22.5 \text{ }^\circ\text{C}$ to 17.4°C . Calculate ΔH , in kJ/mol of NH_4NO_3 , for this dissolution process. Assume the specific heat of the solution is that of water, $4.184 \text{ J}/(\text{g}\cdot\text{K})$. Is this an endothermic or an exothermic process?

3. A 1.00 g sample of pine nuts was burned in a bomb calorimeter containing 250.0 grams of water at an initial temperature of $22.5 \text{ }^\circ\text{C}$. Once the reaction was completed, the temperature of the water was $49.2 \text{ }^\circ\text{C}$. The heat capacity of the calorimeter is $8.74 \text{ J}/^\circ\text{C}$. Calculate the heat of combustion for the pine nuts in kJ/g . How many Cal (food calories) is $100. \text{ g}$ of pine nuts?