

AP Chemistry - Calorimetry Problems

1. A 1.000g gram sample of the rocket fuel hydrazine, N_2H_4 , is burned in a bomb calorimeter containing 1.200×10^3 g of water. The temperature of the water rises from 24.62°C to 28.16°C . The heat capacity of the calorimeter is $820.0 \text{ J}/^\circ\text{C}$.
 - (a) Calculate the heat released by the reaction.
 - (b) Calculate the ΔH of combustion. Report your answer in kJ/mol .

2. The enthalpy of combustion of benzoic acid ($\text{C}_6\text{H}_5\text{COOH}$) is commonly used as the standard for calibrating constant-volume calorimeters; its value has been accurately determined to be -3226.7kJ/mol . When 1.9862 g of benzoic acid is burned, the temperature rises from 21.84°C to 25.67°C . What is the heat capacity of the calorimeter?
(Assume that the quantity of water surrounding the calorimeter is exactly 2.000 kg .)