

## HOMWORK:

Additional Calorimetry Problems. Turn-in with Problem Set #6

1. A 25.0 g piece of aluminum at 4.0°C is dropped into a beaker of water. The temperature of water drops from 75.0°C to 55.0°C. What amount of heat did the aluminum absorb? The specific heat of Al is 0.902 J/g°C.
2. Benzoic acid ( $\text{C}_6\text{H}_5\text{CO}_2\text{H}$ ) was used to calibrate a bomb calorimeter. Its enthalpy of combustion is accurately known to be -3226.7 kJ/mol. When 1.0236 g of benzoic acid was burned in a bomb calorimeter, the temperature of the calorimeter and the  $1.000 \times 10^3$  g of water surrounding it rose from 20.66°C to 24.47°C. What is the heat capacity of the calorimeter?
3. To determine the heat capacity of a bomb calorimeter, a student added 150g of water at 50.0°C to the bomb. The bomb initially was at 20.0°C. The final temperature of the water and the bomb was 32.0°C. What is the heat capacity of the bomb in J/°C?
4. 0.1111g of Octane,  $\text{C}_8\text{H}_{18}$ , was burned in the presence of excess  $\text{O}_2$  in a bomb calorimeter. The heat capacity of the calorimeter was  $1.726 \times 10^3$  J/°C. The temperature of the calorimeter and  $1.200 \times 10^3$  g of water rose from 21.22°C to 23.05°C. Calculate the heat of combustion per gram of octane.