

PHYSICS 190: MECHANICS and HEAT; Lab 11: Specific Heat of a Metal

1. Set up

- a. Materials needed: temperature probe, Universal Lab Interface (ULI), computer with Logger Pro software, calorimeter, triple beam balance, metal samples, hot plate, thermometer and a 2 liter beaker
- b. Using hot plate heat water in beaker until boiling
- c. Using the boiling water heat the metal samples

2. Measurements

- a. Measure and record temperature of the boiling water with metal sample
- b. Measure and record mass of calorimeter
- c. Measure and record mass of the water in the calorimeter
- d. Place the temperature probe into water in the calorimeter
- e. Remove metal samples from boiling water and place in the calorimeter
- f. Start collecting temperature data just before metal samples are placed in calorimeter
- g. Record data until peaks and then starts to decline
- h. Record initial and peak temperature

3. Analysis

- a. Using the initial and peak temperature of water in the calorimeter calculate the specific heat of the metal sample

4. Questions

- a. What is the value of the specific heat of your sample?
- b. Compare your results with the standard value using a percent error calculation.
- c. What effect would a higher room temperature have on the calculated specific heat?
- d. What effect would a better calorimeter have on the calculated specific heat?
- e. What effect would the transfer of a small amount of hot water from the sample bath to the calorimeter have on the calculated specific heat?
- f. How does ignoring the mass of the temperature probe affect your calculation?