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?