

Calculating the Specific Heat of a Metal

Goal: To use calorimetry to determine the specific heat of a metal

Safety: Goggles and aprons

Procedure:

- 1) Start a water bath by heating 100+ mL of water in a 250mL beaker.
- 2) Weigh the metal.
- 3) Place the metal in the boiling water bath and allow it to reach the temperature of the water bath.
- 4) Measure the temperature of the water bath with the thermometer while stirring.
- 5) Measure out 20mL of water and pour into the Styrofoam cup.
- 6) Measure the temperature of the water in the cup while stirring.
- 7) With tongs, remove the metal from the boiling water and immediately place in the Styrofoam cup.
- 8) Measure the final temperature in the cup by stirring with the thermometer until the temperature stops changing.
- 9) Pour water down the drain. Place metal on the table to dry.

Data

- 1) mass of metal _____
- 2) volume of water _____
- 3) initial temperature of water in the cup _____
- 4) initial temperature of metal (sitting in water bath) _____
- 5) final temperature of water in the cup _____

Calculation for specific heat of metal

Percent Error (based on the C_p of Cu = 0.38 J/g°C)

Questions

- 1) How did you determine the final temperature of the metal?
- 2) Which changed temperature more, the metal or the water? What does that tell you about the specific heat of the metal compared to the water?
- 3) List 2 sources of error other than the limitations of your measuring equipment.
- 4) On the back of the paper, draw 2 particle diagrams, one for before the hot copper was put in the cool water, and one after they had been together for a while.
- 5) On the back of the paper, draw the energy bar charts for the change of the water, and the change of the copper.