

Specific Heat

Theory: The purpose of this activity is to demonstrate five equal-massed metal specimens, when heated to the exact same temperature and added to a precise amount of water, will alter the temperature of the water to a significantly different extent. What is the reason for this? Each of the metals has a different specific heat!

Procedure:

1. Weigh a specific heat metal sample on a balance to the nearest tenth of a gram. Record this mass in a data table.
2. Place the metal sample in a boiling water bath for approximately 5-10 minutes to be sure the temperature of the sample is 100 °C,
3. Fill a calorimeter with a measured quantity of room temperature or slightly chilled water. Record the mass of the water used. Measure and record the temperature of the water in the calorimeter.
4. Using tongs lift up the heated metal sample from the boiling water bath and carefully place it into the water in the calorimeter.
5. Stir the water in the calorimeter slowly and constantly. Use a thermometer to measure and record the highest temperature that the water reaches.
6. Repeat this for two other masses

Materials/ Tools needed:

Metal Samples: Al, Cu, Pb, Sn, Zn

Balance

Styrofoam Cup

Hot plate/Hot Water

Cold Water

Tongs

Thermometer

Data:

Calculate the Energy gained by the water. ($c=4.184\text{-J/g}^\circ\text{C}$)

The energy gained by the water was lost by the metal.

Calculate the specific heat of the metal.

Use the table below to identify the metal.

Metal	Specific Heat (J/g°C)
Aluminum	.899
Copper	.385
Lead	.129
Tin	.222
Zinc	.385