Calorimetry – Measurement of Heat Energy

Why?

The amount of energy released or absorbed by a chemical reaction can be measured using a calorimeter. This information is essential to understanding the stability of chemical compounds, predicting equilibrium concentrations in chemical reactions, and identifying conditions for a reaction to occur efficiently and safely. In this activity you will learn how the energy change in a chemical reaction can be measured using a calorimeter.

Success Criteria

- Quantify the relationship between heat absorbed or lost and an observed temperature change.
- Calculate the heat required to raise the temperature of a given mass of water.
- Determine the specific heat capacity of a substance other than water.
- Compare the expected temperature changes for a sample of lead with the expected temperature change for a sample of water of equal mass.

Prerequisites

- Exothermic Change
- Endothermic Change
- Law of Conservation of Energy

Information

- **Heat** is the energy associated with the random motion of particles.
- The unit for **Heat Energy** is the **Joule (J)**.
- **Kinetic Energy** is the energy associated with the motion of atoms and molecules.
- **Temperature** is a measure of the **energy** in a sample of material.
- The symbol **ΔT** refers to **"the change in temperature."**
  Example: $\Delta T = 5.00$ °C means a temperature **change** of 5 °C.
- **Heat Capacity** is the energy required to raise the temperature of a 1 g sample of a substance 1 °C (or 1 Kelvin degree).
- The specific heat capacity for water is 4.18 Joules/gram Kelvin degree

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