It’s getting hot in here!

Chemical Reactions are accompanied by the release of energy or the need for energy. Reactions in which energy is released to the surroundings are described as **exothermic**. Those in which energy is taken from the surroundings are **endothermic**. The energy released in the chemical reaction was previously stored as chemical potential energy. These reactions can be measured by a change in temperature.

Equipment:

Thermometer 100 mL beaker **[note corrosive materials]**

Plastic spoon distilled water

Steel wool stoppers

Saturated copper(II) sulfate solution (25 mL)

The following solids (about a teaspoon of each)

Sodium hydroxide [NaOH] ammonium chloride [NH4Cl]

Sodium acetate [NaCH3COO] sodium chloride [NaCl]

Barium hydroxide [Ba(OH)2] ammonium thiocyanate [NH4SCN]

Procedure:

Part A: solutions

1. Place about 30 mL of water in a 100 mL beaker and measure its initial temperature
2. Add 1 teaspoon of sodium hydroxide pellets, stir gently, and record any change in temperature
3. Repeat procedure using ammonium chloride, sodium acetate and sodium chloride

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| --- | --- | --- | --- | --- |
| Substance | Initial temp (°C) | Final temp (°C) | Change in temp (°C) | Exothermic/endothermic |
| Sodium hydroxide |  |  |  |  |
| Ammonium chloride |  |  |  |  |
| Sodium acetate |  |  |  |  |
| Sodium chloride |  |  |  |  |

Part B: reaction between ammonium thiocyanate and barium hydroxide

1. Place about half a teaspoonful each of solid ammonium thiocyanate and solid barium hydroxide in test tube. Cork the test tube and shake gently
2. Feel the outside of the test tube and make note of your observation

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| Observations  |  |

Part C: reaction between iron and copper sulfate solution

1. Place about 25mL of copper sulfate solution into a 100 mL beaker and record the temperature
2. Place a ball of steel wool about 1 cm thick into the solution and hold it under the surface with the thermometer. Record any evidence of reaction and change in temperature

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| Initial Temp °C | Final temp °C | Change in temp °C |
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| Observations  |  |

