**Student Worksheet**

**Practical 8: Reactions involving energy changes**

**Table of results**

|  |  |  |  |
| --- | --- | --- | --- |
| **Mixture** | **Initial Temperature (oC)** | **Final Temperature (oC)** | **Exothermic or Endothermic** |
| Zn + CuSO4 solution |  |  |  |
| Mg + HCl solution |  |  |  |
| NH4NO3 and H2O |  |  |  |
| H2O + conc HCl (CARE) |  |  |  |
| CaCO3 + Heat – through limewater |  |  |  |
| Mg + Fe2O3 (demo) |  |  |  |
| Mg + CuO (demo) |  |  |  |
| Sugar + conc H2SO4 (demo) |  |  |  |
| H2 + O2 (demo) |  |  |  |

**Procedure**

1. Copy the table of results.
2. Put about 1 cm depth of liquid in a test tube.
3. Record its temperature.
4. Add a heaped spatula of solid or an equal volume of second reactant.
5. Record the highest or lowest temperature reached.
6. For those with a grey box, just add the chemicals and decide whether the reaction is exothermic or endothermic.



Corrosive



Harmful

**Safety**

* Wear eye protection.

**Objective**

* Be able to measure the temperature change for a reaction.

**Questions**

1. How would you decide which reactions in the table are exothermic or endothermic?
2. Write the reactions in a list of those which were exothermic and endothermic.
3. Which reactions involve a positive enthalpy change?
4. Which reactions involve a reaction where the enthalpy content of the products is smaller than the enthalpy content of the reactants?

**Equipment/materials**

* Zinc powder
* Magnesium powder and ribbon
* Solid ammonium nitrate
* Hydrogen balloon
* 1M Copper sulphate solution
* 1M and conc Hydrochloric acid
* Iron oxide, copper oxide, calcium carbonate, sugar
* Boiling tube delivery tubes (L shaped)
* Spatulas, pipettes, thermometers and splints
* Tin lids