

PURPOSE: To observe chemical change, to write balance equations for the chemical reactions observed, and to identify different types of chemical reactions .

Pre-Lab: Introduction to Lab

Answer all the following questions.

1. Explain what is meant by a chemical change.
2. State the criteria that may be used to identify whether a chemical change has occurred.
3. State what is a reactant and what is a product.
4. State what information may be obtained from a balanced chemical equation.
5. State the Law of Conservation of Matter and the Law of Conservation of Energy.
6. Explain what is meant by the word “precipitate”.
7. Explain what is meant by “combustion”.
8. Explain what is the role of a catalyst in a chemical reaction.
9. State the test and the expected result for oxygen gas, hydrogen gas, and carbon dioxide gas.
10. Chemical reactions may be classified as synthesis, decomposition, single displacement and double displacement. Explain what is meant by each type of reaction and illustrate your answer with suitable examples. (Use AB, CD, etc.)

Procedure

Prepare a suitable Data Collection Table to record all your observations.

Reaction 1: Reaction of aluminium metal with copper (II) chloride solution

Materials: small beaker, copper (II) chloride solution, a piece of aluminum strip,

Procedure

Place an adequate amount of copper (II) chloride solution into the beaker and then add a piece of aluminum. Record initial observations in the Data Collection Table.

Allow the solution to react with the aluminium for a few minutes. Feel the test-tube.

Record final observations at the end of the experiment, after filtering the products when all the other procedures have been completed.

Clean -Up: A metal pan is to be used to collect all solid materials.

Reaction 2: Reaction between cobalt (II) chloride solution and sodium hydroxide solution.

Materials: small beaker, cobalt (II) chloride solution, sodium hydroxide solution,

Procedure

Place ~ 10 mL of cobalt (II) chloride solution into a small beaker. Record observation.

Add the same amount of sodium hydroxide to the cobalt (II) chloride solution.

Record all observations in the Data Collection Table.

CLEAN-UP: Pour the contents of the beaker into the collecting reservoir.

Reaction 3: Combustion of magnesium ribbon.

Materials: tongs, Bunsen burner, matches, and a small strip of **magnesium** ribbon

Procedure

Take a small strip of magnesium and record observations.

Using tongs, burn the magnesium metal in a Bunsen flame. (**DO NOT LOOK directly at the burning magnesium!**)

Examine the product.

CLEAN-UP: Once cooled, place the product into the metal can to allow it time to cool overnight.

Reaction 4: Decomposition of hydrogen peroxide in the presence of manganese dioxide catalyst.

MATERIALS: Test tube, test tube rack, hydrogen peroxide (H_2O_2), manganese dioxide, wooden splint, matches

Procedure

Place ~ 5 mL of hydrogen peroxide into a test tube.

Prepare a glowing splint.

Add a **very small** amount, (a few grains) of manganese dioxide to the hydrogen peroxide.

When the test tube begins to bubble, place the glowing splint into the mouth of the test tube.

Feel the test tube. Record all observations.

CLEAN UP: Do not pour the contents of the test tube down the sink !

Pour the contents of the test tube into the waste reservoir. Rinse the test tube thoroughly.

Data Collection

Prepare a suitable Data Table for all your observations.

Your Data Table should have precise headers, indicating the name and formula of all reactants in each reaction, the observations at each stage of each of the chemical reaction.

Data Processing and Presentation

For each reaction observed:

- write a word equation,
- write a balanced chemical equation
- state the criteria that was used to indicate that a chemical reaction had indeed occurred for each reaction. State which, if any of the reactions observed were exothermic or endothermic.
- Identify the type of reaction observed in each of the reaction.

Summarize all your results in a suitable Summary Table.

Conclusion

Write a suitable conclusion to answer the purpose of the lab.