

Class Action Application

Problem:

How can observations be used to determine the identity of substances produced in a chemical reaction?

Materials:

safety goggles
magnesium ribbon
wood splints
copper metal
red and blue litmus paper
zinc metal
test tube clamp
Bunsen burner
common laboratory glassware
crucible tongs

Hazard Warning:

Wear safety goggles throughout this activity.

Procedure:

1. Follow the directions to perform the reactions of the four different types. Make good observations and write those observations in the data sheet. You will need to describe what happened and what your materials looked like before and after.
2. Write balanced chemical equations for each of the reactions.
3. Dispose of the liquid wastes in the sink. The solids should be dumped into the waste basket.

Synthesis

1. Hold a 2 cm strip of magnesium ribbon with a tong. Ignite the strip in the flame of a bunsen burner. Do not look directly at the burning magnesium as it may cause serious damage to the eyes. Hold your hand steady so the product does not fall onto the table. Place this into the well of a spot plate and save it for the next step.
2. Place 1-2 drops of distilled water onto the spot plate containing the product of the magnesium burning. Carefully stir the solution. Test the solution with both pink and blue litmus paper. What colors were observed?

Decomposition

Heat a small sample (1/2 spoon full) of solid copper (II) sulfate pentahydrate in a test tube. Remember not to point the mouth of the test tube at yourself or anyone else. Copper (II) sulfate is a skin irritant. Avoid contact with this chemical. Heat only the bottom of the tube where the crystals are located. Be sure to note any deposits on the side of the test tube. Describe any change in the solid left in the test tube. Add 5 drops of distilled water to the solid left in the test tube. Record your observations.

Single Replacement

1. Add 2 mL of 6 M hydrochloric acid, HCl, to a test tube. CAUTION: HCl is corrosive. Keep it off your skin. If you spill acid on yourself immediately flush the affected area with water for 2-3 minutes and notify your teacher. Drop one small piece of zinc into the test tube. When a reaction begins, hold an empty test tube over the mouth of the reaction tube. After one minute, bring a flaming splint to the mouth of the empty test tube. Record your observations. Discard the used zinc in the waste basket.
2. Add 1-2 mL of 1.0 M copper sulfate solution, CuSO₄, to a test tube. Add an iron nail to the test tube. Set this aside and permit the nail to remain in the solution for 10-15 minutes. Note the substance deposited on the nail and any change in the color of the solution.
3. Add 1-2 mL of silver nitrate solution, AgNO₃, to a test tube. CAUTION: silver nitrate is a skin irritant. Keep it off your skin. Place a small piece of copper metal into the silver nitrate solution. Note the substance deposited on the metal and any changes in the color of the solution.

Double Replacement

1. Place 5 mL of lead (II) nitrate, Pb(NO₃)₂, into a test tube. Add 5 mL of potassium iodide, KI, and record your observations.
2. Place 5 mL of sodium carbonate, Na₂CO₃, into a test tube. Add 5 mL of calcium nitrate, Ca(NO₃)₂, and record your observations.
3. Place 5 mL of 1.0 M sodium hydroxide, NaOH, into a test tube. Add 5 mL of copper (II) sulfate, CuSO₄, and record your observations.

Data Sheet: Observations

You will need to record your observations well enough that you can use your information to identify the chemicals being formed.

Syn. #1 –

Syn. #2 –

Decomp. –

S. Rep. #1 –

S. Rep. #2 –

S. Rep. #3 –

D. Rep. #1 –

D. Rep. #2 –

Data Sheet: Balanced Chemical Equations

Syn. #1 –

Syn. #2 –

Decomp. –

S. Rep. #1 –

S. Rep. #2 –

S. Rep. #3 –

D. Rep. #1 –

D. Rep. #2 –