**Science 10: Chemistry Unit**

**Evidence of Chemical Reactions Lab Activity**

**Problem:** What are the indicators of chemical changes?

**Background info:**

1. Define physical properties

b) Define chemical change

**Hypothesis:** If two reactive substances are mixed together, then the evidence that a chemical reaction has taken place will be…

**Development:**

1. 2 Mg(s) + O2(g) 🡪 2 MgO(s)

Materials: 2 cm Mg ribbon, lighter, watch glass, tongs

Procedures: This experiment will be led by your teacher. Please follow his/her instructions.

1. Zn(s) + 2 HCl(l) 🡪 ZnCl­2 + H2

Materials: Zinc pellet, 10mL HCl, test tube

 Procedures:

1. Label a clean test tube as “A”.
2. Take a zinc pellet and place it in the test tube labelled “A”. Note physical properties.
3. Using a graduated cylinder, measure 10mL of Hydrochloric Acid (HCl). Note physical properties. Pour into the test tube labelled “A”, over the zinc pellet.
4. Make notes of observations. What **proof** is there that new compounds are being created?
5. CuCl2(aq) + Mg(s) 🡪 MgCl2 + Cu(s)

Materials: 1.5g CuCl2, 25mL distilled water, test tube, 10cm strip of magnesium ribbon

 Procedures:

1. Label a clean test tube as “B”.
2. Using a graduated cylinder, measure 25mL of distilled water. Pour into test tube “B”.
3. Using a scale, weigh out 1.5 g of Copper Chloride (CuCl2). Carefully add this quantity to the distilled water in test tube “B”. Stir gently using the wrist rotation method. Note physical properties.
4. Measure and cut a 10cm strip of magnesium ribbon. Note physical properties.
5. Bend one end of the magnesium ribbon into a hook, and gently lower the ribbon into the solution in test tube “B”, leaving the hooked end over the edge of the test tube.
6. Make note of observations. What **proof** is there that new compounds are being created?

**Note: Make your observations over a long period of time. Go on to your next experiments, but periodically come back to check on test tube “B”. The magnesium ribbon can be lifted out of the test tube to get a closer look. Do not touch the part of the ribbon that was submerged. Replace ribbon after observation.**

1. Pn(NO3)2(aq) + 2KI(aq) 🡪 PbI2(s) + 2KNO3(aq)

Materials: 20mL of Potassium Iodide, KI; 3 drops of Lead Nitrate, Pb(NO3)2(aq); filter paper; 2 test tubes; funnel

1. Choose 2 clean test tubes and label one of the “C” and the second one “D”.
2. In test tube “C”, place 20mL of Potassium Iodide (KI) solution. Take note of its physical properties.
3. Place test tube “C” in the test tube rack and go get a bottle of Lead Nitrate, Pn(NO3)2(aq). Bring this bottle back to your lab station. Note the physical properties of this substance.
4. Add 3 drops of lead nitrate to test tube “C”.
5. Write down your observations. What **proof** is there that a new substance has been created?
6. Place the funnel in test tube “D”. Fold the filter paper and place it inside the funnel (NOTE: If you’ve never used filter paper, please call the teacher over for some instruction on this step!). Slowly pour the contents of test tube “C” into test tube “D” through the funnel and filter paper. Write down your observations. What **additional proof** does this give you that a new substance has been created?
7. H3C6H5O7(aq)  + 3 NaHCO3(s) 🡪 3 CO2(g) + 3 H2O(l) + Na3C6H5O7(aq)

Materials: 25mL of Citric Acid solution, H3C6H5O7(aq); 15gr of sodium bicarbonate, NaHCO3(s); graduated cylinder; thermometer, glass stirring rod.

Procedures:

1. Using your graduated cylinder, measure 25mL of citric acid, H3C6H5O7(aq).
2. Use the thermometer to measure the temperature od the citric acid. Make note of this measurement.
3. Using an electric scale, weigh out 15gr. of sodium bicarbonate, NaHCO3(s). Make note of the physical properties of this substance.
4. Carefully add the sodium bicarbonate to the citric acid in your graduated cylinder. Observe the reaction. Make note of your observations.
5. Use the thermometer to measure the temperature of the solution created. Make note of this measurement.

**Data Collection:**

* Complete the attached table as your data collection

**Conclusion:**

In your conclusion, don’t forget to include:

* The answer to your initial problem
* Your supporting evidence
* Whether you accept or reject your hypothesis
* Sources of errors

**Data Collection:**

|  |  |  |
| --- | --- | --- |
| Experiment | Observations of Physical Properties | Evidence of Chemical Change |
| 2Mg + O2 🡪 2MgO | Magnesium ribbon: |  |
| Magnesium Oxide: |
|  |  |  |
| Zn(s) + 2 HCl(l) 🡪 ZnCl­2 + H2 | Zinc pellets: |  |
| Hydrochloric Acid: |
|  |  |  |
| CuCl2(aq) + Mg(s) 🡪MgCl2 + Cu(s) | Copper Chloride (solid): |  |
| Copper Chloride (Solution) : |
|  |  |  |
| Pn(NO3)2(aq) + 2KI(aq) 🡪 PbI2(s) + 2KNO3(aq) | Potassium Iodide solution : |  |
| Lead Nitrate solution: |
|  |  |  |
| H3C6H5O7(aq)  + 3 NaHCO3(s) 🡪 3 CO2(g) + 3 H2O(l) + Na3C6H5O7(aq) | Citric Acid solution : |  |
| Sodium Bicarbonate : |