2.4 Lab: Activity Series Investigation

**A. Purpose:** Create an activity series based on observations of solid magnesium, aluminum, iron, copper, and zinc in dilute hydrochloric acid and compare it to an established activity series.

**B. Hypothesis:**

*[Your prediction for the activity series. What is this prediction based on? No personal pronouns.]*

**C. Materials:***[Add anything else you used that isn’t listed here]*

|  |  |
| --- | --- |
| * 5 test tubes * Test tube rack * Beaker with 50mL of 0.1 mol/L hydrochloric acid * Sandpaper | * Copper wire * Zinc pieces * Magnesium strip * Aluminum foil * Iron nail |

**D. Procedure:**

1. All of the materials were collected at a lab bench.
2. Sandpaper was used to remove the oxide layer from each metal. Samples of similar size were chosen. Descriptions of each metal sample were recorded in the observation table.
3. Five test tubes were placed in the test tube rack. The sample of each metal was added to the test tube.
4. A description of dilute hydrochloric acid was recorded in the observation table and the same amount of acid was added to each of the test tubes so the samples were completely covered.
5. The samples were observed for 10 minutes and the observations recorded.
6. The test tubes and beaker were thoroughly rinsed out and metal samples were returned to the teacher.

**E. Observations:**

Hydrochloric acid:

*Table 1: Observations [Be descriptive. If I wasn’t doing the lab I should be able to picture it!]*

|  |  |  |
| --- | --- | --- |
| ***Metal sample*** | ***Description of metals before added to hydrochloric acid*** | ***Observations after hydrochloric acid was added*** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

*[Pictures taken during the lab are a good way to communicate observations as well!]*

**F. Analysis:**

*[Complete the following questions. Include the question in your answer. Provide experimental evidence for each answer. Cite any external sources, including the textbook.]*

1. Write out the balanced chemical equations for each of the metals. Write NR instead of products for the metals that weren’t observed to react.
2. Create an activity series based on the observed reactions.
3. Use the activity series from question 2 to predict whether or not the following reactions would occur. Write a balanced chemical equation for the reactions that do proceed.
   1. A magnesium strip added to a copper nitrate solution
   2. Aluminum foil added to a zinc sulfate solution
   3. Zinc metal added to aqueous iron (III) oxide
4. Compare your activity series to the activity series from page 126 of your textbook [1]. Investigate any differences and discuss the experimental error that could have lead to a different answer.
5. A gas should have been produced in each of the samples that reacted. Identify the gas based on your equations. How could you experimentally verify that it was actually the predicted gas?

**G. Conclusion:**

*[Summarize your results and compare them to your hypothesis. Discuss the experimental error and suggestions for how you could improve the experiment if you or someone else were to repeat it]*

**H. Works Cited**

[1] S. Haberer and M. DiGiuseppe, *Nelson Chemistry 11: University Preparation*. Toronto: Nelson Education, 2011.

[2] *[List any additional resources]*