**CHEMISTRY HONORS LAB 5.6**

REACTION OF METALS WITH ACIDS AND WATER

Introduction

Some metals, but not all metals, react with acids.

A small number of metals react with water.

Metal-acid and metal-water reactions are examples of redox reactions.

The extent to which these reactions take place depends on the reactivity of the metal.

Procedure

Part 1 – group 2 metals and d-block metals

1. Watch these videos: [metal-acid reactions](https://www.youtube.com/watch?v=Na_6j9y9ke8) and [metal-water reactions](https://www.youtube.com/watch?v=Yj70bUtXd4Q)
2. Complete the following table: (6 points)

|  |  |  |
| --- | --- | --- |
| Metal | observations on addition of HCl | Observations on addition of H2O |
| calcium |  |  |
| copper |  |  |
| Iron |  |  |
| magnesium |  |  |
| Tin |  |  |
| Zinc |  |  |

1. Answer the following questions: (5 points)

|  |  |
| --- | --- |
| (a) | Write an equation for the reaction between Mg and HCl. |
|  |
| (b) | Write an equation for the reaction between Mg and H2O |
|  |
| (c) | Which atom is oxidized in these reactions and which atom is reduced in these reactions? |
|  |
| (d) | Why do these reactions produce bubbles? |
|  |
| (e) | Why are the reactions with acids much faster than the reactions with water? |
|  |
| (f) | In the metal-water video, something was added to the water before the water was added to the metals. What was it, and why was it added? |
|  |
| (g) | Based on these observations, rank the six metals above in order of reactivity, starting with the most reactive. If you cannot choose between them based on the above observations, rank them equally. |
|  |

Part 2 – Group 1 metals

1. Watch these videos: [alkali metals 1](https://www.youtube.com/watch?v=uixxJtJPVXk), [alkali metals 2](https://www.youtube.com/watch?v=m55kgyApYrY)
2. Answer these questions: (4 points)

|  |  |
| --- | --- |
| (a) | Write an equation for the reaction between a Group 1 metal and water (choose any Group 1 metal). |
|  |
| (b) | How does the reactivity of Group 1 metals compare with the reactivity of Group 2 metals and d-block metals? |
|  |
| (c) | How does the reactivity of Group 1 metals change as you go down the group? |
|  |
| (d) | Why are Group I metals often called “alkali metals”? |
|  |

1. Answer these questions for extra credit: (5 points)

|  |  |
| --- | --- |
| (a) | Why is potassium more reactive than sodium? Why is calcium more reactive than magnesium? |
|  |
| (b) | You won’t find any videos between francium and water on youtube. Why not? |
|  |