Introduction

How does Water effect the corrosion of Copper, Steel, and Aluminum

- Metals Oxidize or Hydroxylase
- The Metals Do nothing for 11 days.
- The test was going for 2 weeks
- The Metals corroded Very slow.

Compounds produced

- Copper oxide CuO
- Iron oxide FeO
- Aluminum hydroxide Al(OH)3

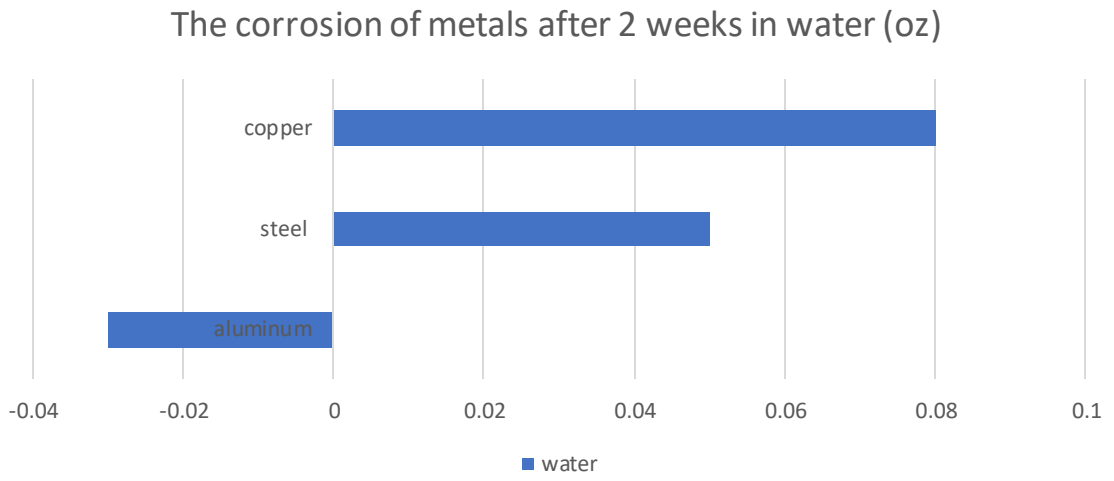
Hypothesis

- How does Water effect the corrosion of Copper, Steel, and Aluminum?

Research Question

How much do certain metals corrode in certain liquids

Data/Results



Methodology

Collect 3 metals (Copper, Aluminum, Steel)
Dip Each Metal into a bowl of water (50ml)
Use percentages to find how much in metal was lost or oxidized

Conclusion

Each metal did not oxidize as quickly as quickly as originally thought.
Steel Corroded the least as steel is known for corrosion resistance.
The copper visible corroded the most as there was a ton of rust on the copper bar.
Aluminum was the only metal to noticeably dissolve in the water.
A longer test would most likely lead to noticeable increase in corrosion.

Procedure

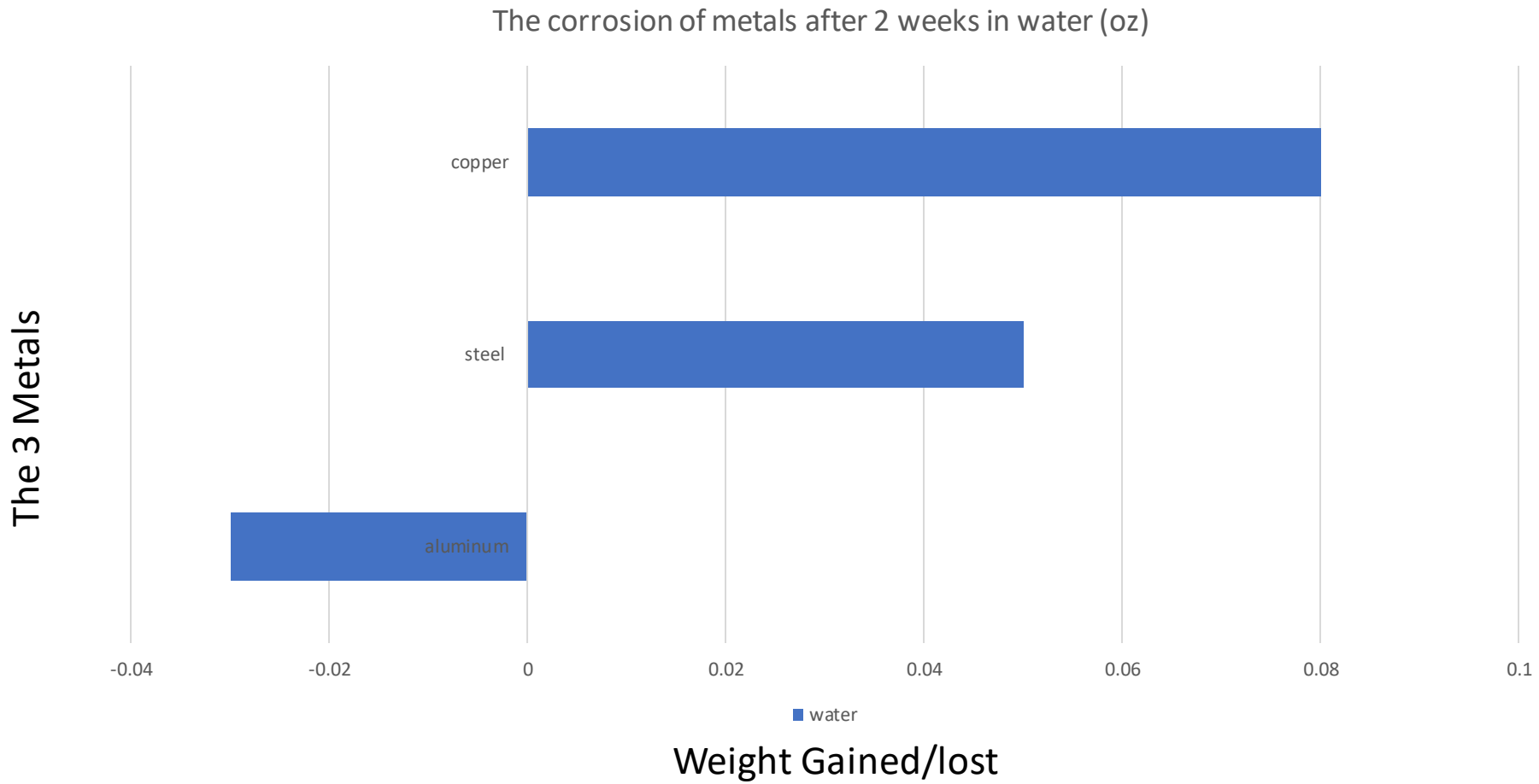
- 3c
- Materials: 3 bowls to hold liquid , 50 milliliters of 3 liquids water and soda, juice to corrode the metals, 1inch x 1inch x .25 inch pieces of 3 aluminum, steel, tungsten to dip in to the liquids
- Dipping metals in liquids
- Step 1: The metals were weighed on a scale to Check their weight
- Step 2: The 3 metals were dipped into a bowl of liquid (water and soda, juice)
- Step 4: Each metal was dipped into each liquid (water and soda, juice) Each metal was put in the liquids for 1 week and allowed time for corrosion to take place.
- Step 5: The data was observed visually and quantitatively using weight. The metals were weighed again to check how much the metal corroded. This was repeated twice

Results page 1

	Aluminum	steel	copper
water	-.0375%	.025%	.03478%

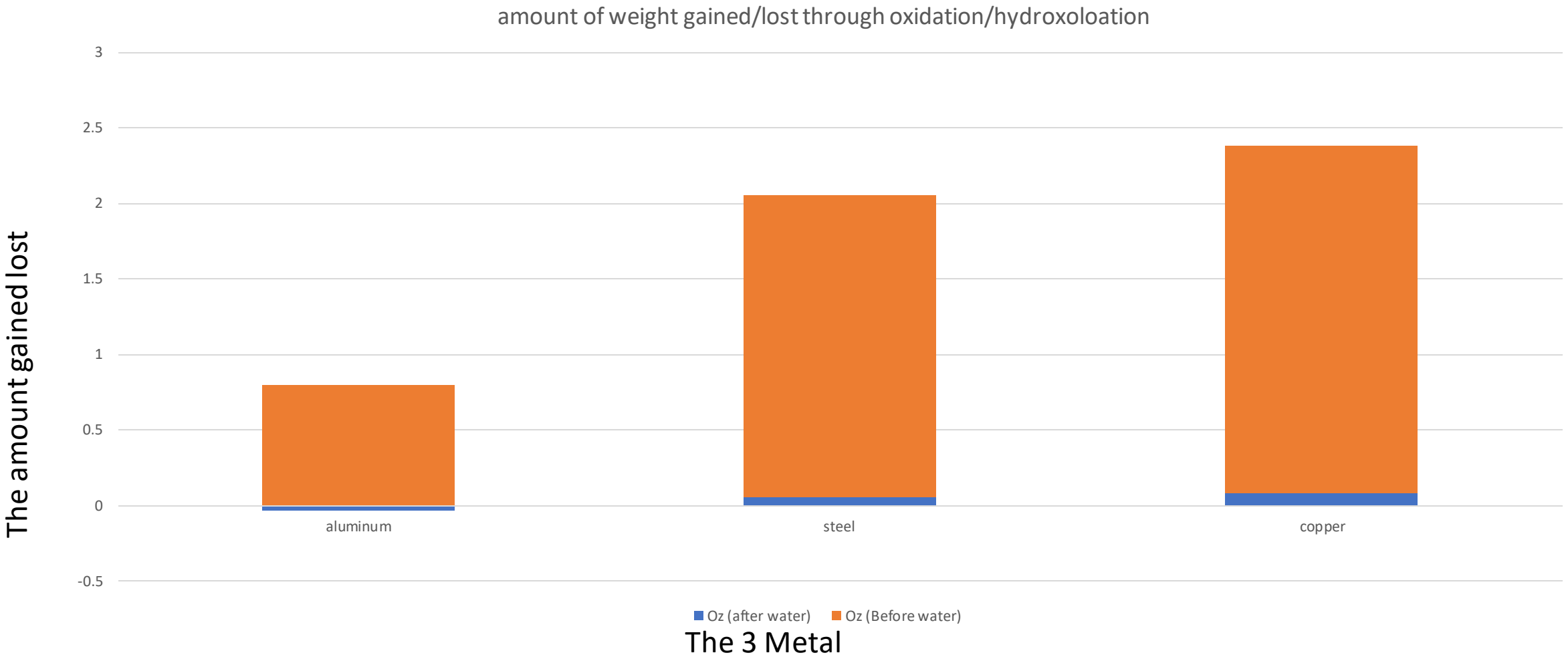
This shows the percent amount of rust that accumulated in the metals via how much oxygen had combined.
The Aluminum lost weight from the aluminum becoming Aluminum Hydroxide
The Aluminum started at .8oz ended at .77
Steel started at 2oz ended at 2.05
Copper started a 2.3oz ended at 2.38oz

Results Page 2



The bar graph will show in a visual form the difference of in weight of the metal in how much it gained or lost (in oz) due to Oxidation/Hydroxylation.

Results Page 3



The bar graph will show in a visual form the difference of in weight of the metal in how much it gained or lost (in oz) due to Oxidation/Hydroxylation.
Aluminum was the only one to dissolve in the water.

Conclusion

- My claim is that the least corroded metal will be steel. The amount of rust gained on the steal will be very small due to the carbon in the steel. The data will show that each metal has a different corrosion rates. This shown through the fact that stainless steel is used in knifes and other strong objects and is used because it is not as easy to corroded. These are supported by the fact that stainless steel is supposed to be extremely hard to rust. Steel supports that steel corroded the least.

Data Analisis/Error

- In the data Analisis it went smoothly. I had only one problem and that was having to keep the water filled in each bowl over the course of 2 weeks. A possible error is the water evaporating and not rusting the metals equally. I recorded my data by subtracting the weight of each metal before and after being in water, to show how much in ounces that each metal lost or gained in weight.

Science talk

- The different metals corroded in an unexpected order 3 Steel, 2 copper, 3 aluminum. I was surprised to see that the aluminum was the most corroded metal. The aluminum had been dissolving in the water in a process known as hydroxylation. The copper and steel didn’t start to rust till 3 days before the projects ended. Out of all the metals only copper and steel oxidized.

Real World application

- The use of metals is widespread with steel, copper, and aluminum being used most. Copper is used as is extremely great at conducting electricity. Steel is used for very strong but unfortunately heavy parts. Aluminum is used to make light parts that don’t require high tension forces.

Refrences

- 1 Aluminum Alloys: Structure and Properties - L. F. Mondolfo - Google Books
- 2 Characterization of Surface Oxide Layers on Black-Colored Titanium (scirp.org)
- 3 Formation Mechanism of Micro- and Nanocrystalline Surface Layers in Titanium and Aluminum Alloys in Electron Beam Irradiation
- 4 Full article: Predicting the performance of tungsten in a fusion environment: a literature review (tandfonline.com)
- 5 Lead poisoning from retained bullets. Pathogenesis, diagnosis, and management. (nih.gov)