

# Which Metals Work Best in the Process of Electrolysis?

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# Question:

Which metals work best in the process of electrolysis when splitting hydrogen and oxygen from water?

# Abstract

We will be using 5 different metals in this experiment, testing them in the same conditions for each individual test to see which metals can separate the most hydrogen and oxygen in a given amount of time. The metals include: tin, stainless-steel, copper, aluminum, and zinc. Each metal will be tested 20 times to ensure there are no errors in the experiment and to weed out any bias information upon observation of the conditions of the different materials. The metals would be placed under the same conditions in their own special containers to avoid any outside factors from affecting the data.

# Hypothesis

If we use stainless steel in the process of electrolysis, then it will release more oxygen and hydrogen, in less time than the other metals, because Stainless-Steel is a more resilient material and doesn't rust and/or corrode as easily.

# Procedure

We will test the following metals: tin, stainless-steel, copper, aluminum, and zinc. Each metal will be tested 20 times to ensure there are no errors in the experiment and to weed out any bias information upon observation of the conditions of the different materials. The metals would be placed under the same conditions in their own special containers to avoid any outside factors from affecting the data.

## Procedure (Part 2)

They will be placed in individual containers with a saltwater solution to ensure the metals are conductive inside the water. The salt in the water in which the metals are submerged in provides a better conduction between the metal plates, making salt water the most effective fluid to use. Salt or NaCl is the element in which the effect of a combination of sodium and chlorine create sodium-chloride or salt. When salt is added or mixed into the water, it becomes sodium ions ( $\text{Na}^+$ ) and chloride ions ( $\text{Cl}^-$ ), which is a corpuscle that conducts electricity.

## Procedure (Part 3)

After the saltwater solution is put into the containers, two of the same metals will be placed into each container, with one sheet connected to a positive lead of a wire and the second sheet to the negative lead of a wire. Each test will repeat this process with the only change being the type of metal. Each test metal will be given a time limit of the same, and the same amount of energy or voltage. We will be testing which metal(s) can produce the most hydrogen and oxygen under the same conditions and time. After the metals have completed the process we will measure the amount of oxygen and hydrogen it has generated, then collect and compare the data with the remaining data of the other metals.

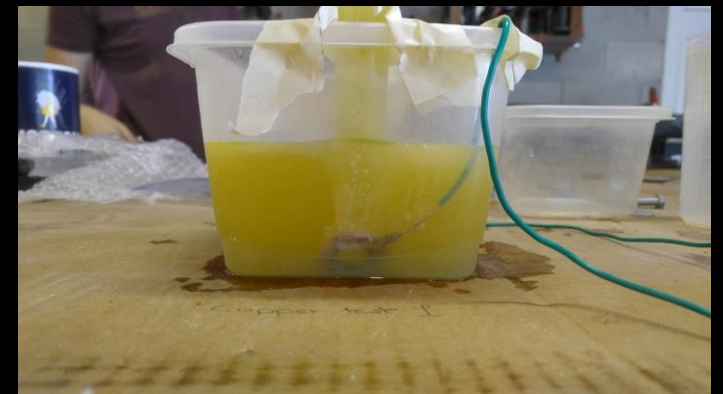
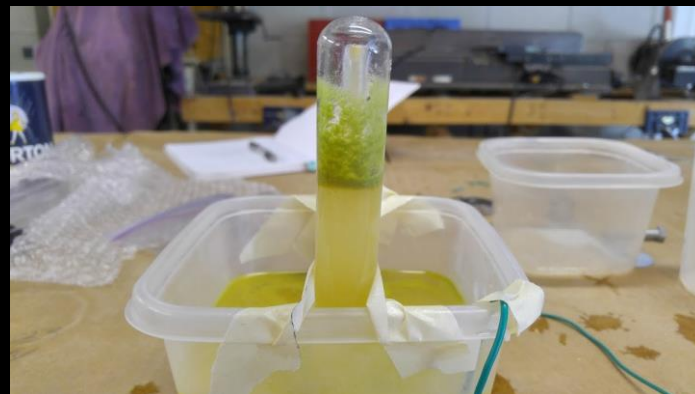
# Materials

Materials Consist Of:

- 1) ½ in. Copper washer - 10x
- 2) ½ in. Stainless Steel washer - 10x
- 3) ½ in. Aluminum washer - 10x
- 4) ½ in. Zinc washers - 10x
- 5) ½ in. Tin washer - 10x
- 6) Tupperware Containers - 5x
- 7) Homemade Power Bench Supply - 1x
- 8) Salt-water solution



# Experiment



# Results & Data

## (Averages; See Link for All Results)

Copper:

Oxygen - 0 mL  
Hydrogen - 10 mL

Aluminum:

Oxygen - 7.5 mL  
Hydrogen - 20 mL

Stainless Steel:

Oxygen: - 0 mL  
Hydrogen - >29.57 mL

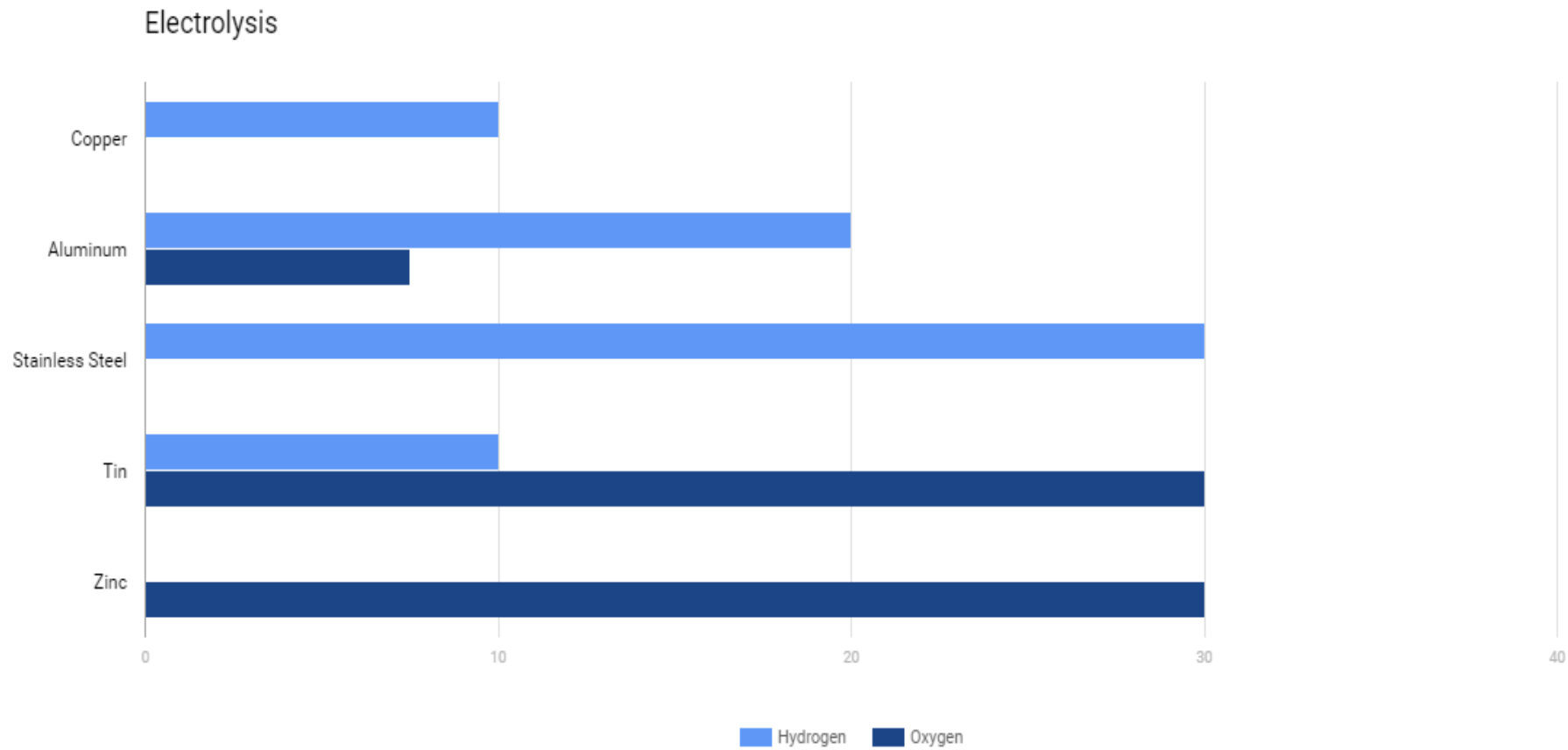
Tin:

Oxygen -  
Hydrogen -

Zinc:

Oxygen -  
Hydrogen -

# Graph



# Conclusion

The stainless steel, zinc and tin metals all had maxed out hydrogen in the test tubes at more than 29.57 mL. The stainless steel and copper both had 0 mL of oxygen within the 15 minute period.

In conclusion, the tin best conducted both the hydrogen and the oxygen.

# Works Cited

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