CASE

Engineering Process Template

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Title

Building a Better Battery

Problem

Batteries are a very important part of fueling simple everyday items. We were tasked with the problem of creating a better battery than what the zinc to copper battery created. So using the given materials we had to create a battery that was better than that baseline.

Requirements

In order for the battery to be considered “better” it must exceed 136 RPM’s. This is the baseline information that was for the zinc to copper battery.

Solution

We decided to use the copper because of it’s willingness to accept electrons. This is because it only has 1 valence electrons. We decided to use the magnesium because of how volatile it was in previous experiments.

We also decided that we needed to place the copper and magnesium in cells that were side by side in order to have the highest RPM’s, because this decreased the space which the electrons had to travel.

Materials for Prototype

- Electrolyte solution
- Chamber and stand
- Red and black lead with alligator clips
- Electric motor
- Metal strips
- Stopwatch

Name: _____

Procedure for Building Prototype

1. Fill chamber with the electrolyte solution
2. Insert the Magnesium strip in the far left column
3. Place the copper strip in the far right column.

Test and Evaluation

1. Attach the black lead to the magnesium and the other end to the motor
4. Attach the red lead to the copper and the other end to the motor.
5. Start a stopwatch
6. Count how many times the flag turns in 15 seconds
7. Move the magnesium one column to the right and repeat 3-4
8. Continue until the copper and the magnesium is side by side

	Baseline of Copper and Zinc	Copper and Magnesium
RPM's	136	220

Analysis and Results of Tests

After conducting our tests, we found that the best placement of the metals are side by side in the chamber. This is because there is less space for the electrons to move, creating more efficiency and allowing there to be higher RPM's.

We found that the Copper and magnesium were the best combination. This is because they produced the highest RPM's in the desired column configuration.

The RPM's of the copper and the zinc was 136 RPM'S, and we found that with the copper to the magnesium we were able to attain 220 RPM's. That was because of the coppers ability to accept electrons, and magnesium's extreme willingness to give electrons.

Conclusion

After conducting our experiment, we found the best battery was formed when we used the copper and the magnesium, and when they were side by side in the columns. After calculating the RPM's with different column configuration, and with other metals we found that this was the best, and resulted in the most RPM.

Other areas that we could now explore would be:

Increasing the number of metal pieces attached to each lead.
Create a higher molarity of the electrolyte solution
Sanding the metals to increase the surface area