**PURPOSE**

To study the effectiveness of H₂O as an electrolyte and 100% Carbon as a catalyst in a Lithium-Air battery.

**Why Lithium-Air?**
- Lithium-air batteries have one of the highest theoretical energy densities.

**Workings of a Lithium-Air Battery**

Li → Organic E. → Solid E. → Aqueous E. → Catalyst → O₂

**OBJECTIVES**

1. Design a Lithium-Air battery and test air as a cathode.
2. Test water as an effective electrolyte.
3. Compare the effectiveness of Carbon versus Platinum as a catalyst.

**Why Water?**
- We are using H₂O, because it is neutral, not a solvent, and extremely abundant.

**Why Carbon?**
- It is able to work effectively as a catalyst and generates power.
- Carbon is extremely cheap and very plentiful in nature, making it a viable option for commercial use.

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**METHODOLOGY**

**Experimental Design**
- The battery was assembled as shown in the figure below.
- Lithium-Air Battery Schematic

- Tested using a constant current testing station.

**RESULTS & DISCUSSION**

**Test Results**
- The voltage was measured with time. This was done for several different current values and for two catalysts

**Platinum Catalyst Results**

**Carbon Catalyst Results**

- Platinum catalyst has superior performance but the carbon catalysts performance is still comparably effective.

**PH Level in Water With Carbon**

During discharge the PH of the water increases because of the formation of Lithium Hydroxide in the water. Which results in the water electrolyte becoming more basic. As a result, this could cause the ceramic separator to dissolve causing the battery to fail.

**CONCLUSION**

The design of Lithium-air battery technology is an ongoing process. The use of water as an electrolyte presents several problems, but may be solved by finding a solid electrolyte that is stable in basic solutions or an aqueous electrolyte that does not become basic. In addition, although the carbon catalyst is not as effective as the Platinum catalyst it is effective enough to operate the battery for commercial use.

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**REFERENCES**


[e] pictures generated by students