# Article information:

Carbon treated commercial aluminium alloys as anodes for aluminium-air batteries in sodium chloride electrolyte - ScienceDirect  
<https://www.sciencedirect.com/science/article/pii/S0378775316308308>

# Article summary:

1. Carbon-treated commercial aluminum alloys can be used as anodes in aluminum-air batteries, achieving discharges up to three times longer.

2. Al1085 alloy performs better at low current rates, while Al7475 performs better at high rates.

3. Specific capacities of 1200 mAh g-1 are achieved, and 2 V plateaus in a 4s1p battery.

# Article rating:

Appears moderately imbalanced: The article provides some useful information, but is missing several important points or pieces of evidence that would be required to present the discussed topics in a balanced and reliable way. You are encouraged to seek a more balanced perspective on the presented issues by exploring the provided research topics and looking at different information sources.

# Article analysis:

The article titled "Carbon treated commercial aluminium alloys as anodes for aluminium-air batteries in sodium chloride electrolyte" discusses the potential of using commercial aluminum alloys as anodes in aluminum-air batteries. The article highlights the advantages of using aluminum, such as its high theoretical energy density and abundance, and the fact that atmospheric oxygen is used in the cathodic side instead of a stored reagent.

The article also discusses the challenges associated with using aluminum alloys as anodes, such as the spontaneous formation of an oxide film on the surface when in contact with air or aqueous media. This protective layer covering the electrode shifts the corrosion potential in the positive direction and slows down the reactivity of aluminum. However, many research groups have focused on developing an Al-air cell because of its high theoretical cell voltage and specific capacity.

The authors present their method to enhance the discharging behavior of commercial Al alloy anodes in neutral electrolyte Al-air battery by incorporating carbonaceous materials on the alloy surface. The method tolerates a higher use of aluminum mass, achieving discharges up to 1200 Ah·kg−1 with quite flat potential evolution. To face low cell potential, a 3D printed 4s1p battery was designed and measured, achieving discharges up to 5 mA·cm−2 with voltage plateaus of 2 V.

While this article presents interesting findings regarding using commercial aluminum alloys as anodes in aluminum-air batteries, there are some potential biases and missing points to consider. Firstly, while it is true that aluminum is abundant and easily available material compared to lithium or other typical energy storage materials that are located in a few countries, it is important to note that mining for bauxite (the primary source for producing aluminum) can have significant environmental impacts.

Secondly, while this study focuses on neutral salt-water electrolyte due to its low self-corrosion rate compared to alkaline electrolyte, it is important to note that both types of electrolytes have their advantages and disadvantages. For example, alkaline electrolytes have a higher cell potential but suffer from self-corrosion reactions resulting in constant hydrogen evolution and uncontrolled aluminum mass loss.

Thirdly, while this study presents promising results regarding using carbon-treated commercial Al alloy anodes in neutral electrolyte Al-air batteries, it would be interesting to explore how these findings compare with other methods such as tailored Al alloys or additives like metallic salts into the electrolyte.

Overall, this article provides valuable insights into using commercial aluminum alloys as anodes in aluminum-air batteries but should be read critically considering potential biases and missing points.

# Topics for further research:

* Environmental impacts of bauxite mining
* Advantages and disadvantages of alkaline electrolytes in aluminum-air batteries
* Tailored aluminum alloys for aluminum-air batteries
* Metallic salt additives in aluminum-air battery electrolytes
* Comparison of different anode materials for aluminum-air batteries
* Challenges in scaling up aluminum-air batteries for practical applications

# Report location:

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