# Article information:

A Novel Calcium‐Ion Battery Based on Dual‐Carbon Configuration with High Working Voltage and Long Cycling Life - Wu - 2018 - Advanced Science - Wiley Online Library
<https://onlinelibrary.wiley.com/doi/10.1002/advs.201701082>

# Article summary:

1. A novel calcium-ion battery based on a dual-carbon configuration has been developed, using low-cost and environmentally friendly carbon resources as anode and cathode materials.

2. The Ca-ion-based dual-carbon battery can work reversibly at room temperature in conventional carbonate electrolyte dissolving Ca(PF6)2, with a discharge capacity of 66 mAh g−1 at a current rate of 2C at an extremely high working voltage up to 4.6 V.

3. This Ca-DCB exhibited a good cycling stability with a discharge capacity of 62 mAh g−1 after 300 cycles with a high capacity retention of 94%, which is the best performance of the reported Ca-ion batteries.

# 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 "A Novel Calcium‐Ion Battery Based on Dual‐Carbon Configuration with High Working Voltage and Long Cycling Life" presents a new configuration of a Ca-ion full battery with low-cost and environmentally friendly carbon resources as anode and cathode materials. The authors claim that this designed Ca-ion-based dual-carbon battery (Ca-DCB) can work reversibly at room temperature in conventional carbonate electrolyte dissolving Ca(PF6)2, with a discharge capacity of 66 mAh g−1 at a current rate of 2 C at an extremely high working voltage up to 4.6 V. Moreover, this Ca-DCB exhibited good cycling stability with a discharge capacity of 62 mAh g−1 after 300 cycles with a high capacity retention of 94%, which is the best performance of the reported Ca-ion batteries.

The article provides detailed information about the advantages of multivalent cations over monovalent ions such as Li, Na, and K, contributing to larger capacity under the same concentration. However, it fails to mention any potential drawbacks or limitations associated with multivalent cations.

The authors also discuss the challenges associated with developing a Ca-ion battery due to slow diffusion of Ca2+ into active materials and poor cycling stability within 100 cycles. They propose replacing the metallic calcium anode by intercalation-type active material as a feasible strategy to avoid calcium plating and stripping.

While the article provides detailed information about the working mechanism of the Ca-DCB, including characterization on the EG cathode and MCMB anode during charging/discharging states, it does not explore any potential risks associated with using this technology or provide any counterarguments against its use.

Overall, while the article presents promising results for the development of a novel calcium-ion battery based on dual-carbon configuration, it lacks balance in presenting both sides equally and exploring potential drawbacks or limitations associated with multivalent cations.

# Topics for further research:

* Limitations of multivalent cations in battery technology
* Calcium plating and stripping in Ca-ion batteries
* Safety concerns associated with Ca-ion batteries
* Comparison of Ca-ion batteries with other battery technologies
* Strategies to improve cycling stability in Ca-ion batteries
* Environmental impact of Ca-ion batteries compared to other battery technologies

# Report location:

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