

From Lithium-Ion to Sodium-Ion Batteries: Similarities and Surprises

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Sodium based battery systems operating at room (or low) temperature have been recently revisited and significant progress has been achieved in the last few years. [1,2] The research is mainly motivated by the abundance of sodium and the larger amount of sodium compounds in comparison with lithium.

Due to the chemical similarity of lithium and sodium, one could easily conclude that the Li-ion and Na-ion cells behave pretty much the same. But it appears that this is not the case and differences exist in most, otherwise identical cells. At the end, this finding is related to the larger ionic radius of Na^+ compared to Li^+ which affects both the thermodynamic and kinetic properties of the cell reaction. Whether the resulting differences are of advantage or disadvantage to a reversible cell chemistry is scientifically an intriguing question.

Content of this presentation will be a systematic comparison between a selection of analogues lithium- and sodium based battery systems. Examples will include layered oxides, carbon materials [3], graphite [4], conversion reactions [5], alkali-sulfur cells [6] and alkali- O_2 cells [7].

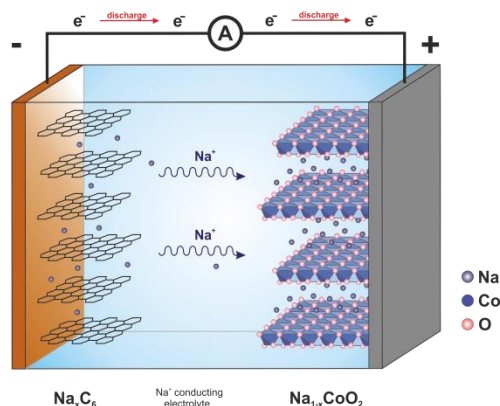


Figure 1: Does a Na-ion battery works the same way as a Li-ion battery?

References

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