"Next generation electrochemical energy storage based upon magnesium"

Advances in energy storage devices are required for the widespread implementation of intermittent renewable electricity generation technologies such as photovoltaics and wind power. In addition, electrification of transportation will allow for the substitution of liquid fossil fuel energy with renewably sourced energy. Energy storage platforms based on more abundant resources are essential for sustainable solutions. Batteries employing magnesium metal anodes are a potential alternative to Li-ion. Magnesium is a good replacement for lithium as it is relatively inexpensive, already recovered commercially from the ocean, and it also has high specific energy capacity. To be a viable option for electric vehicle or grid-scale energy storage technology, the magnesium battery must be safe, efficient, and have a long lifetime. In this talk, I will discuss our recent findings on two aspects of magnesium battery electrochemistry: reversibility of magnesium metal anode electrodeposition and stripping as affected by electrolyte speciation, and magnesium-sulfur cathode rechargeability and kinetics.

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