**Beyond Li-ion batteries: Advanced energy-storage technologies**

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Conventional Li-ion batteries (LIBs) have dominated most battery markets for the last 30 years; however, it is now urgent to explore suitable alternatives because of the limited Li mineral resources. Among many candidates for new battery systems that use non-Li sources such as Na, Mg, Ca, Zn, and Al, rechargeable Mg metal batteries (RMBs) have attracted considerable attention as promising substitutes owing to their unique advantages, including the abundance of Mg metal resources in the Earth’s crust, their high chemical stability against water and oxygen, and their low redox potential (−2.36 V vs. SHE, standard hydrogen electrode). Also, the Mg ion can transfer two electrons per ion during a redox reaction, resulting in high volumetric capacity (3,833 mAh cm−3). Despite their great advantageous, there have been few reports on research strategies to improve the electrochemical performances of RMBs. Therefore, it is now urgent to find a new way for improving the performance of RMB and various technical issues also should be solved. This talk aims to introduce Mg metal batteries as next-generation battery systems, and will cover various strategies to improve the electrochemical performances.