

The Effect of Lithium Salt in Highly Concentrated Electrolyte for Lithium Sulfur Batteries

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Recently, the properties of electrolyte have been reported as powerful parameter affecting the behavior of Li ion battery. Among them, Li salt has been regarded as important parameter that can influence not only the battery performance but also Li metal stabilization. In the same line with this view, highly concentrated salt has been attracted because of its various unusual functionalities such as high electrochemical stability for advanced lithium ion battery. However, even though highly concentrated electrolyte has many advantages for advanced Li ion batteries, it cannot be applied in Li-S batteries due to the limited solubility of sulfur related species.

In this work, we applied different two types of salt in highly concentrated electrolyte for Li-S batteries. The combination of salt with electro-donating property changed the Li₂S deposition chemistry and increased equilibrium concentration of polysulfides in electrolyte as well as Li metal stabilization. This finding offers understanding about peculiar solvation structure under highly concentrated electrolyte and novel strategy for modulating electrochemical reduction mechanism in highly concentrated Li-S batteries.