Analysis of Aqueous Rechargeable Li-Air Batteries

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Abstract

Non-aqueous Li-air cells often suffer drawbacks of solid lithium oxide deposition in the cathode pores, moisture and carbon dioxide contamination, and electrochemical instability of aprotic electrolytes [1-2]. On such problems, aqueous electrolytes, especially acids, can function well [3]. In an aqueous Li-air cell, a water-stable lithium ion conducting ceramic membrane is used. This water impermeable membrane can prevent direct lithium reaction with water, enabling construction of hybrid electrolyte Li-air battery (HyLAB) [4-9].

Although aqueous-based systems represent a promising alternative approach and do not suffer much of the problems of aprotic cells, there are still technical challenges in the development of HyLABs. In this talk, we present a systematic analysis of HyLABs, using sulfuric acid electrolyte as a case study. Results to be presented include rechargeability, energy densities, and cost feasibility of HyLABs. Technical challenges will also be addressed in the analysis.

References

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