Dual Cell System for Li-O_2 Batteries

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Although extremely high energy density of Li-O_2 batteries (theoretically), low energy efficiency, poor cycle life and Li-metal safety issues make the use of them yet impractical. Therefore, efforts are made to protect/block the lithium metal anode in these cells, in order to mitigate side reactions. However, new approach[1-3] is required in order to solve the problems mentioned above, especially the irreversible reactions of the redox mediators which are mandatory to these systems with the Li anode.

In this poster, optimized dual cells are proposed, in which detrimental crossover between the cathode and anode is completely avoided. The Li metal anode is cycled in electrolyte solution containing fluorinated ethylene carbonate, in which its cycling efficiency is excellent. The cathode compartment contains ethereal solution with redox mediator that enables oxidation of Li_2O_2 at low potentials. The electrodes are separated by a solid electrolyte membrane, allowing free transport of Li ions. This approach increases cycle life of lithium oxygen cells and their energy efficiency.[2] The cell structures and methodologies described herein can serve as very good platforms for further effective & respective research on each cell components and development work in the field.

References:

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