Lithium- and Manganese-Rich Cathodes: A Deep Dive and a Look Forward

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Lithium- and manganese-rich cathode materials have been extensively studied for the past decade or more. Due to the promise of substantial capacity and energy gains this class of cathodes still commands interest despite the possibly, insurmountable challenges that remain. One reason for continued interest is the fact that there are very few alternatives within the space of conventional lithium-ion that have the potential to meet the demands of next-generation technologies; namely, transportation applications. In 2012 the U.S. Department of Energy commissioned a "Deep Dive" study into the now well-known phenomenon of voltage fade associated with this class of cathodes[1]. This presentation will give an overview of the insights gained from that recently-concluded, ~3-year study and discuss a few, as-of-yet, unanswered questions. A current strategy moving forward will be presented and state-of-the-art comparisons will be made.

[1] J.R. Croy, M. Balasubramanian, K.G. Gallagher, and A.K. Burrell, Acc. Chem. Res. 48 (2015) 2813-2821.