# Nitrogen: An Energy Storage Medium for the Electric Grid

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Imagine a battery where instead of relying on the stripping and platting of a metallic lithium anode one could reversibly oxidize and reduce an effectively free anode material - $N_2$. This hypothetical $N_2/N^{-3}$ redox couple when matched with a potential $O_2/O^{-2}$ cathode could yield a cell with a potential of ~ 2.5 V with a capacity over 2.4 kWhr/kg via this reaction:

$$2Li_3N + 1.5O_2 \leftrightarrow 3Li_2O + N_2$$

In this presentation we will describe results concerning the electrochemical reduction of $N_2$, electrolytes needed to support this reaction, and the cycleability of $N_2$. This reaction has benefits beyond energy storage towards chemical synthesis and new energy storage processes.

Acknowledgement: The majority of this work was supported by Dr. Imre Gyuk (DOE Office of Electricity). Small molecule activation is supported by the Laboratory Directed Research and Development program (ORNL).

Biography:

Gabriel Veith is a Senior Staff Scientist and Team Lead at the Oak Ridge National Laboratory specializing in new materials development for energy storage and catalysis. His work involved the synthesis of supported metal catalysts and understanding how the support material's properties mediate nanoparticle stability and catalytic activity. This experience with supported metal catalysts was exploited during the early investigations of Li-air batteries where he helped identify the reaction mechanisms in aprotic solvents as well as the development of all solid-state Li-air cells. Since the early Li-air work Gabriel has branched out to develop neutron methods to understand battery chemistry *in situ* and recent work on sodium ion batteries and new electrolytes. He is the author of over 160 peer reviewed publication and 4 patents.