Na-Metal Halide Battery for Stationary Energy Storage Applications

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The environmental concerns and constrains of the fossil fuels, combined with energy security worries, have spurred increasing interests in efficient and renewable energy. The transition from fossil to a sustainable renewable future however cannot be realized without effective energy storage in order to smooth out the intermittency of the renewable energy and make it dispatchable. Among the most promising storage technologies for the stationary and transportation applications are electrochemical storage technologies or batteries that convert electrical energy into chemical energy or vice versa. As part of the DOE's Office of Electricity Energy Storage Program, PNNL is working on the research and development of electrochemically active materials and components for varied battery technologies suitable for stationary energy storage applications. Na-Metal Halide batteries are one such system which can meet the needs of the large scale storage application. Na-Metal Halide batteries have a theoretical specific energy about 790 Whr/Kg, a high cell voltage (2.58 V), safe cell failure mode (internal self-discharge), and good cycling characteristics which make them suitable for larger scale energy storage. This presentation will focus on our recent work in Na-Metal Halide battery development including the impact of operating temperature on degradation of Na-metal halide chemistries and the substitution of $ZnCl_2$ in the cathode.