A Large Format Stationary Energy Storage Device Based on a Composite Sodium Titanium Phosphate Anode Materials System

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This presentation will cover the scaling implementation of large-scale energy storage electrochemical batteries. The core devices, which we are calling Aqueous Hyrbid Ion batteries, use an configuration wherein the anode consists of a composite system of carbon and $NaTi_2(PO_4)_3$, and the cathode is an MnO_2 – based alkali intercalation compound (either $Na_4Mn_9O_{18}$ or cubic spinel λ-MnO).[1] Data will be presented showing that large scale industrially packaged individual batteries with over 200 Wh in capacity (at 8 V at full state of charge) have be produced, qualified, and inserted into large format systems.

Further data will show that packs of these batteries in the multi-kWh range have been effectively implemented in field-testing. This will include support for both smaller off-grid applications with bus voltages in the in the 20 to 100 V range, as well as, grid compatible systems with bus voltages in excess of 800 V as controlled by several different off the shelf inverter systems using custom battery management firmware. These data are especially compelling because no cell-level battery management system was used to maintain string integrity. The recombinant nature of the battery chemistry provides for a self-regulating overcharge condition that allows for even very high voltage battery strings to have long-term stability.

Key topics to be addressed include: (1) a description of the manufacturing of these devices, (2) lifetime performance of this system in a range of environmental conditions, (3) data from third party field tests in relevant applications showing the performance of our batteries under application specific load profiles, and (3) our vision for future implementation of this technology on a large scale scale.