

Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Electrochemistry of ion inserted vanadium oxide nanosheets¹

MARC POMEROY, SHAOLA REN, QIFAN YUAN, VICTORIA SOGHOMONIAN, Virginia Tech — Electrochemical energy storage is becoming increasingly important for its high specific power and quick charge and discharge rates. We investigate the electrical properties of hydrothermally synthesized vanadium oxide nanosheets as potential anode component of an electrochemical capacitor. The room temperature resistivity of the as-synthesized and pristine vanadium oxide nanosheets is around 10^7 ohm-cm, and variable temperature measurements indicate the semi-conducting behavior of the material. Electrodes are fabricated from the nanosheets, and inserted into appropriate chloride solutions of Li, Na and ammonium. Room temperature voltammetry in the solutions are recorded and provide a measure of stored energy relative to each cation. Scanning electron micrographs obtained before and after various cyclic voltammograms provides a visual measure of nanosheet stability and a correlation to its electrochemical activity. Micrographs show that the material is robust towards Li insertion, but after several cycles of ammonium insertion, degradation occurs. Degradation upon Na insertion is minimal. These comparative studies shed light on the interactions between ions and metal oxide nanosheets.

¹We acknowledge support from NSF DMR 0943971 and 1206338.

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Date submitted: 07 Nov 2012

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