Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Structure of electrolyte decomposition products on high voltage spinel cathode materials determined by in situ neutron reflectometry JIM BROWNING, GABRIEL VEITH, LOIC BAGGETTO, NANCY DUDNEY, WYATT TENHAEFF, Oak Ridge National Laboratory — Interfacial reactions on electrical energy storage (EES) materials mediate their stability, durability, and cycleablity. Understanding these reactions in situ is difficult since they occur at the liquid-solid interface of an optically absorbing material that hinders the use of techniques such as infra-red spectroscopy. Furthermore, since the interfaces involve liquids classic vacuum-based analytical methods can only probe reaction products, which are stable under vacuum. Here, we present the results of an in situ neutron reflectometry study detailing the formation of a thick solid-electrolyte interphase (SEI) on a high voltage spinel cathode material. The cathode/electrolyte system used in this study is a LiMn1.5Ni0.5O4 thin film subjected to a 1.2 molar LiPF6 in 1:1 ethylene carbonate - dimethyl carbonate electrolyte solution.

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Date submitted: 09 Dec 2011 Electronic form version 1.4