Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Vacuum-Assisted Self-Assembly of Polymer Derived Siliconoxycarbide-Graphene Composite as Li-ion Battery Anode LAMUEL DAVID, GURPREET SINGH, Kansas State University — Exfoliated graphene oxide (GO) and polysiloxane were blended and pyrolyzed to synthesize freestanding SiOC-graphene composite papers ($\sim$ 10 μm thick). The structural and chemical characterization of the composite prepared with varying ceramic concentrations was carried out using electron microscopy, XRD, XPS and FT-infrared spectroscopy. High resolution microscopy images shows layer by layer stacking of GO sheets and an increase in interlayer spacing was observed by X-ray analysis. FTIR peaks at 3400 cm-1 (O-H), 1720 cm-1 (C=O), 1600 cm-1 (graphene), 3056 cm-1 (Si-CH=CH2) and 1034 cm-1 (Si-O-Si) confirmed the successful functionalization of SiOC with GO. Thermo-gravimetric analysis showed enhanced thermodynamic stability of the composite paper up to at least 700 °C in flowing air. The SiOC/Graphene composite paper anodes showed stable electrochemical capacity of approx. 500 mAh/g which was twice that of free standing graphene anodes. The average coulombic efficiency (second cycle onwards) was observed to be approx. 97%.

Lamuel David
Kansas State University

Date submitted: 29 Nov 2012 Electronic form version 1.4