Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Electrophoretic deposition of RuO2/HRGO composites for flexible supercapacitor electrodes FATIMA AMIR, Winthrop Univeristy, VIET PHAM, Brookhaven National Laboratory, DAKODA MULLINAX, Winthrop University, JAMES DICKERSON, Brookhaven National Laboratory — Flexible energy storage devices are essential for the development of wearable electronics, such as bendable displays and wearable multi-media systems. A subset of these energy storage devices, flexible supercapacitors have received increased attention because of their long cycle life, low cost, and easy fabrication. Herein, we report an easy and low cost method to fabricate bendable ruthenium oxide (RuO_2)/ holey reduced graphene oxide (HRGO) electrodes using electrophoretic deposition. Analysis of the surface morphology using scanning electron microscopy (SEM) shows a highly nanoporous structure with pores ranging from 2 to 3 nm. The obtained RuO_2/HRGO supercapacitor exhibited excellent electrochemical capacitive performance in a PVA-H_2SO_4 gel electrolyte, with a specific capacitance of 418.5F/g. Additionally, a high rate performance with capacitance retention of 85% was observed when the current was increased by a factor of 20 from 1.0 to 20.0 A/g. The supercapacitor exhibited an exceptional cycling stability of 88.5% after 10,000 cycles, indicating excellent long term electrochemical stability.

Fatima Amir
Winthrop Univeristy

Date submitted: 24 Oct 2015 Electronic form version 1.4