Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Fe-catalyzed carbon nanotubes for high-energy density carbon-based supercapacitors[1] ROBERT EMMETT, MEHMET KARAKAYA, MARK ROBERTS, MARGARITA ARCILLA-VELEZ, RAMAKRISHNA PODILA, APPA-RAO RAO, Clemson University — Carbon nanotubes (CNTs) are one of the most suitable supercapacitor electrode materials due to their high mechanical strength, electrical conductivity, and surface area. Albeit these unique properties of CNTs, energy density of carbon-based double layer capacitors is limited by the inability of CNTs to actively participate in redox processes. Here, we show that electrochemical characteristics of CNTs can be improved by activating the residual Fe catalyst to participate in Faradaic charge storage via Fe^{2+} ->Fe^{3+} redox process. By using traditional liquid injection chemical vapor deposited CNTs which contains 5.7 wt.% residual Fe catalyst (R. Andrews et al.,, *Chem. Phys. Letters*, **303**, 467-474 (1999)), the capacitance of CNT electrodes can be increased from 20 F/g to 150 F/g, in the range of -0.2 to 1.2 V. The use of Fe containing CNTs to manufacture supercapacitor electrodes with increased energy density and charge capacity of with high charge/discharge rates with extremely long-term cycle stability will be discussed.

[1]Research supported by US NSF CMMI Grant1246800.

Deepika Saini
Clemson University

Date submitted: 15 Nov 2013 Electronic form version 1.4