Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Ultrathin Graphene Membranes as Flexible Electrodes for Electrochemical Double Layer Capacitors SAIKAT TALAPATRA, Physics, Southern Illinois University Carbondale, SWASTIK KAR, Physics, Rensselaer Polytechnic Insititute, RAKESH SHAH, SUJOY GHOSH, Physics, Southern Illinois University Carbondale, XIAOHONG AN, Physics, Rensselaer Polytechnic Institute, TREVOR SIMMONS, Chemistry and Chemical Biology, Rensselaer Polytechnic Institute, MORRIS WASHINGTON, SAROJ NAYAK, Physics, Rensselaer Polytechnic Institute — We will present the results of our investigations of electrochemical double layer capacitors (EDLCs) or supercapacitors (SC) fabricated using graphene based ultra thin membranes. These EDLC's show far superior performance compared to other carbon nanomaterials based EDLC's devices. We found that the graphene based devices possess specific capacitance values as high as 120 F/g, with impressive power densities ($\sim$105 kW/kg) and energy densities ($\sim$9.2 Wh/kg). Further, these devices indicated rapid charge transfer response even without the use of any binders or specially prepared current collectors. Our ultracapacitors reflect a significant improvement over previously reported graphene-based ultracapacitors and are substantially better than those obtained with carbon nanotubes.

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Date submitted: 01 Dec 2009 Electronic form version 1.4