Direct Synthesis of Lithium Intercalated Graphene for Electrochemical Energy Storage Application

Ashavani Kumar,¹ Arava Leela Mohana Reddy,^{1,*} Arnab Mukherjee,² Madan Dubey,³ Xiaobo Zhan,¹ Neelam Singh,¹ Lijie Ci,¹ W. Edward Billups,² John Nagurny,⁴ Gandhi Mital,⁴ Pulickel M. Ajayan^{1,2,*}

¹Department of Mechanical Engineering and Materials Science and ²Department of Chemistry, Rice University,
6100 Main St. Houston, TX 77005, USA

³U.S. Army Research Laboratory, 2800 Powder Mill Rd, Adelphi, MD 20783, USA

⁴Lockheed Martin Maritime Systems & Sensors, 9500 Godwin Drive, Manassas, VA 20110, USA

*To whom correspondence should be addressed. E-mail: leela@rice.edu, ajayan@rice.edu

Section 1S: SEM and TEM microscopy were used to determine the morphology and size of the graphene domains. A representative SEM image of the dry, reduced graphite oxide is shown in Figure 1S (A and B) and reveals randomly aggregated, thin, crumpled sheets that form a disordered solid powder with a “fluffy” appearance. The fluffy structure shown in the SEM image is due to the aggregation of reduced GO that is formed after solvent evaporation and is in good agreement with previous work.¹⁻³

The absence of charging during the SEM imaging indicates that the network of graphene-based sheets and the individual sheets are electrically conductive. The reduced GO was dispersed in hexane using ultrasonication and a drop coated film was prepared on a carbon coated grid for TEM analysis. Figure 1S (B) is TEM images of reduced GO film showing a wrinkled thin paper-like structure at low magnification.

Figure 1S: (A) SEM image of drop coated film of graphene sheet on silicon (B) high magnification TEM images of a Li-RGO

Figure 2S: Reaction mechanism of graphene oxide by lithium metal in liquid ammonia

Figure 3S: EELS spectra corresponding to Li and C mappings in Li-RGO sample (Primary energy: 200 keV; Dispersion: 0.3 eV/pixel; Energy shift: 0 eV; Adjust: -2.9 eV).

References:

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