Electrochemical Energy Storage in a model $LiFePO_4$ RGO Aqueous nanofluid.

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Abstract

This study presents a characterization of electroactive nanofluids based on a stable aqueous dispersion of Reduce Graphene Oxide (RGO)/ 3-5 Diaminobenzoic acid (DABA) and $LiFePO_4$, a well know cathode material for LIBs[1], nanoparticles dispersed as electroactive redox material.
True electroactive nanofluids can become a solution that increase the energy and power densities of the solutions without a dramatic increase of the viscosity of the solution. Electroactive nanofluids are a completely novel approach for the electrical energy storage[2] and Graphene (RGO in the present case), plays a central role as distributed current collector.
Cyclic voltammetry was used to analyse electrochemical properties. The improved performance of $LiFePO_4$ nanoparticles is due to the electrical percolation effect provided by the RGO dispersion. We also tested charge-discharge of this material.
The results proof applicability of electroactive nanofluid electrodes for high energy density flow batteries.

References

(1) Padhi, A. K.; Nanjundaswamy, K. S.; Goodenough, J. B. *J. Electrochem. Soc.* **1997**, *144*, 1188.
(2) Zhao, Y.; Ding, Y.; Li, Y.; Peng, L.; Byon, H. R.; Goodenough, J. B.; Yu, G. *Chem. Soc. Rev.* **2015**, *44*, 7968.

Figures

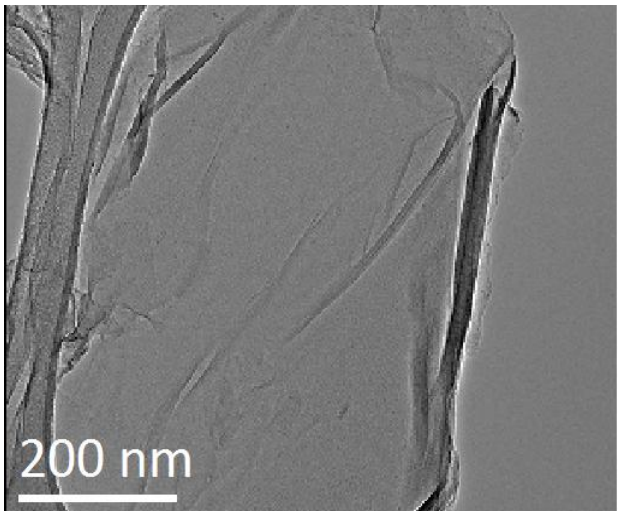

Figure 1: RGO HRTEM image

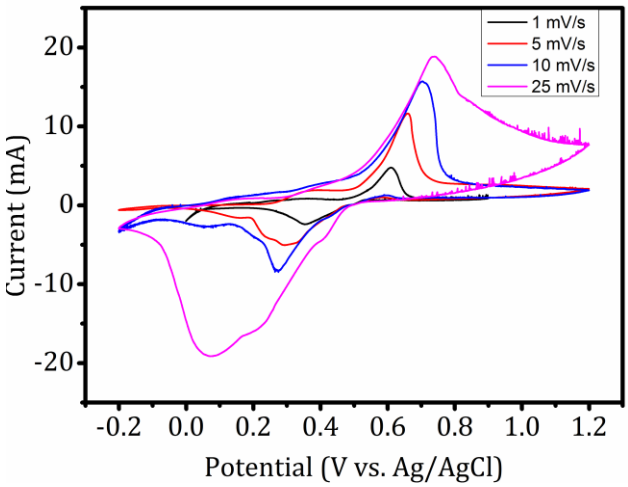

Figure 2: Cyclic Voltammetry at different scan rates, of 1.4 g/L of $LiFePO_4$ 0.3 g/L of RGO and 12 g/L of DABA.