

High-Energy-Density Cost-Effective Graphene Supercapacitors

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We introduce a cost-effective graphene platelet composite material (Fig.1a) as a replacement of an expensive reduced graphene oxide (RGO) for electrodes in high energy density supercapacitors. We have tested low size supercapacitor prototypes Fig 1b with the graphene platelets electrodes and newly developed polymer-gel Li⁺ ion electrolyte (Fig.2).

A working prototype for testing the concept of the high voltage supercapacitor has been developed as well. The first test done up to 10 V showed excellent performance of the multi-cell multi-layer high voltage test assembly.

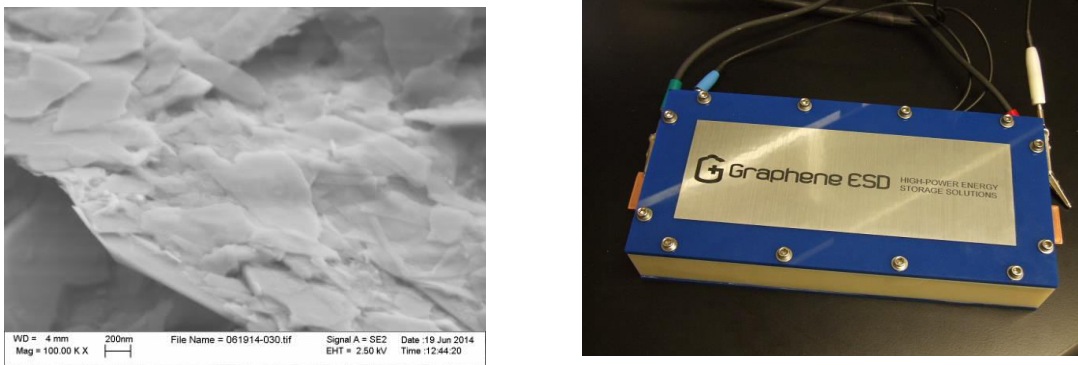


Fig. 1.a) SEM image of graphene platelet electrode material, b) our low size supercapacitor prototype.

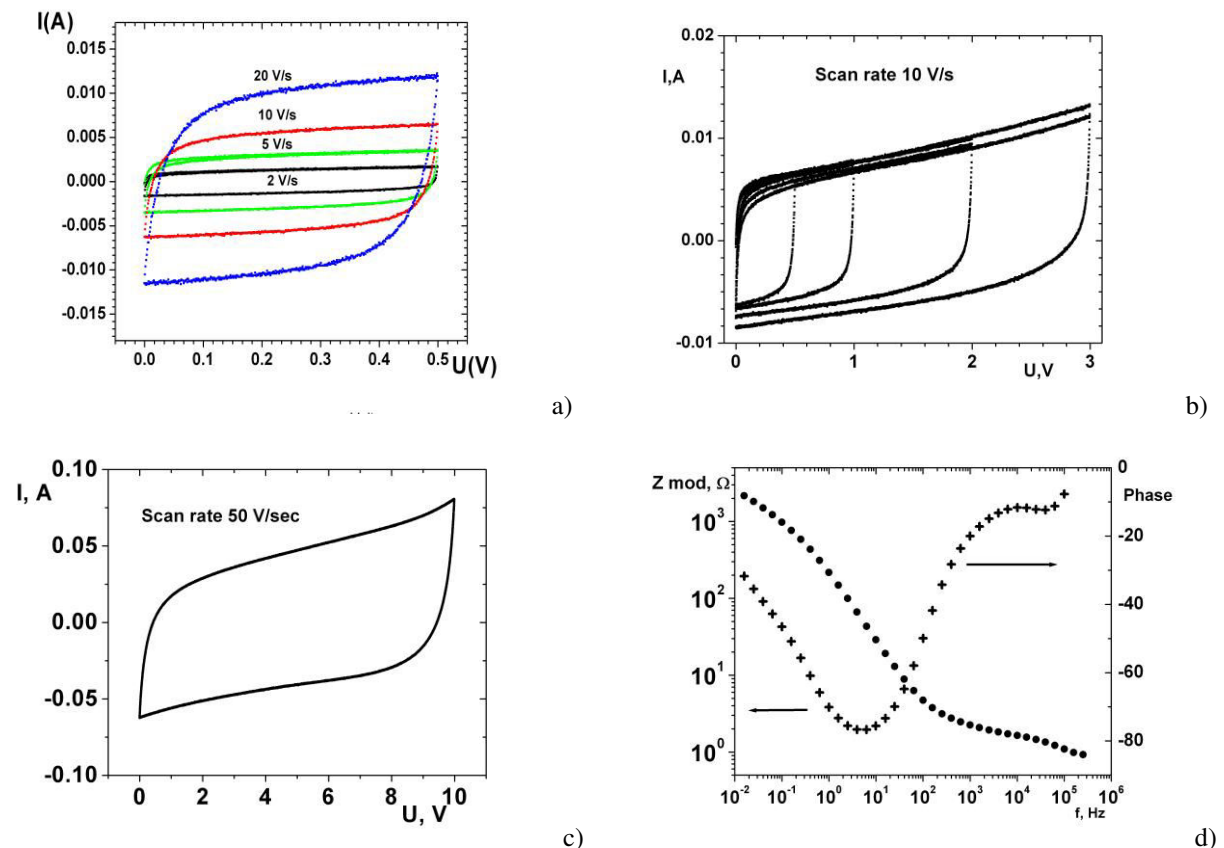


Fig. 2. Electrochemical characterization of our multi-cell multi-layer high voltage test assembly supercapacitor prototype with graphene platelete electrodes: a) Voltammetric curves at different scan rate, c) Voltammetric curves at high scan rate 10 V/s with different voltage limits, c) Voltammetric curve at highest scan rate 50 V/s with 10 V limit, d) EIS curves.