Electrochemical reduction of graphene oxide: synthesis and applications

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Abstract

The past decades have seen a great interest in the carbon nanostructures by its inherent features, e.g. thermal and electronic conductivities, as well as their relevance in the development of photovoltaics and fuel cells, sensors, opto-electronics, and thermoelectric devices[1,2]. Our research group has a great interest in graphene production methodologies and enhances the performance in different applications. In this way, the present work explores two
ways to obtain ERGO using a combination of Hummers[3] and potentiostatic methods. In the first one, GO was obtained starting from an aqueous solution containing graphite in H2SO4 and thereafter reduced using different potentials from 1-4V and AISI 304L as electrodes. The second formulation, was starting from GO produced by the traditional modified Hummers method, followed by a pulse potential method at 1.6 and 2.0 V in H2SO4. Samples characterization were realized using Raman spectroscopy, Ultraviolet-Visible (UV-Vis), Fourier transform infrared (FTIR), X-ray diffraction patterns (XRD) and X-ray photoelectron spectroscopy (XPS). The results shown that depending of the synthesized method the ERGO can be obtained in solution or as a film on the metallic substrate, with potential applications.

References

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Figures

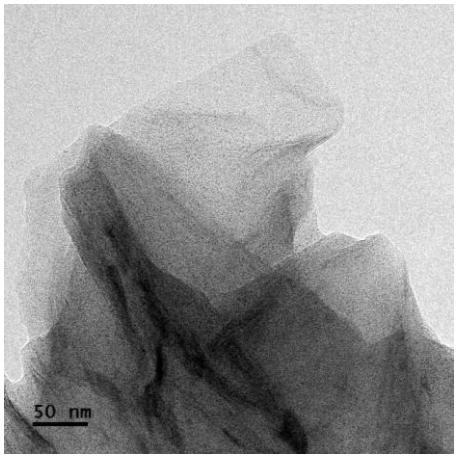

Figure 1.- TEM image of ERGO at 1.6V