Synthesis and deposition of graphene oxide films for solar applications

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Graphene is nowadays one of the most promising nanomaterials being studied in the world due to its excellent electrical, thermal and optical properties. It is believed that graphene could be used to produce ultra-efficient electronic devices and integrated circuits much more advanced than today. In particular, in the case of solar cells, their application is very promising because of its transparency and excellent electrical properties. The aim of this study was the graphene oxide deposition and its morphological and electrical characterization in order to apply in electronic devices, more specifically, solar cells. The deposition technique used was dip-coating, whose principle of operation consists of five steps: dipping, immersion, deposition, drainage and drying, considering that this technique has a number of advantages over the others. The reduction of graphene oxide thin films was made with hydrobromic acid (HBr) to pass them to conduct. Thin films suffer the action of the acid vapour. In this work glass and silicon were used as substrates.
In spectroscopic characterization was used Raman technique that allowed the characterization of their morphological structure, UV-visible technique was used to collect the optical properties of the material. The electrical characteristics were obtained using four point probe and Hall effect to measure resistivity, sheet resistance, density and type of charge carriers (n or p) of the films. IxV curves were obtained and were also made measurements of spectral response. Hall effect results and IxV curve showed that the samples have Schottky contact. Photoelectric effect is evidenced in the spectral response measures. Finally, for better visualization of the structure, was used a scanning electron microscope (SEM).

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