XVII-ICSMV



Contribution ID: 46

Type: Oral

USE OF AGROINDUSTRIAL WASTE TO OBTAIN GRAPHENE OXIDE FOR VARIOUS APPLICATIONS

Graphene oxide (GO) is a useful and promising carbon nanomaterial for applications in electronics, optics, chemistry, energy storage, and biology. Due to the presence of hydroxyl, carboxyl, and epoxy functional groups in the basal and edge plane of GO, this material is easily dispersed in aqueous solvents, which makes it more convenient to process and use. GO is usually obtained by the Hummers' method by oxidizing graphite, in which a considerable volume of strong acid residue is generated. For this reason, currently the use of green chemistry in nanomaterials research aims to decrease and eliminate the presence of toxic and polluting compounds during GO synthesis. The use of peanut and coffee crop residues to produce nanomaterials can be an alternative for their final disposal, thus obtaining a value-added product in different science areas. In the present work, we produced GO through pyrolysis of different agro-industrial wastes, which are: peanut shells, post-use commercial, and artisanal coffee, and were compared with GO produced by the Hummers method. Subsequently, GO from different materials was functionalized with magnetite by chemical coprecipitation for use as a catalyst. The functional groups present in the obtained nanomaterial are used as nucleation

centers for the formation of metal oxides. Therefore, a higher number of functional groups present on the surface will lead to the formation of metal oxide nuclei, obtaining metal oxide nanoparticles with good dispersion on GO films for energy and environmental applications such as biofuel generation, adsorptive removal of dyes in water and antimicrobial activity in wastewater treatment plants.

Keywords

Graphene oxide, agro-industrial wastes, nanoparticle, renewable, magnetite

Reference

Somanathan, T., Prasad, K., Ostrikov, K., Saravanan, A., & Krishna, V. (2015). Graphene Oxide Synthesis from Agro Waste. Nanomaterials, 5(2), 826–834. MDPI AG.

This work was supported by

CONAHCYT basic science project CB-A1S-8817 and Sinergía-UNAM 1564464

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Session Classification: RENEWABLE ENERGY

Track Classification: Renewable Energy: Materials and Devices