

Systematization of the routes towards synthesis of the graphene oxide controlling the chemical reduction via thermal treatment and sonification process

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Graphene-based materials with different functionalities have been studied and widely used in numerous technologies applications. Because of its versatility, graphene and its derivatives have been used in nanocomposite systems for energy production and storage [1]. However, the large-scale production with structural quality is one factor to be improved for graphene technologies. Graphite chemical exfoliation using strong oxidant agents is the method more commonly used for large-scale production of graphene and its derivatives, but, the structural quality depends on synthesis conditions control during all process, including the intercalation process of compounds in the carbon layers on the graphitic structure as well the chemical reduction from the specific treatment processes. Based on these considerations, this work has as goal the systematization of the routes towards synthesis of the graphene oxide from controlling the time and temperature for chemical reduction via thermal treatment and the ultrasonic power for the sonification process. To evaluate the morphological aspects and structural quality of the graphene oxide, field emission scanning microscopy (FEG-SEM), Raman spectroscopy, X-ray diffraction spectroscopy and X-ray photoelectron spectroscopy (XPS) techniques were used. From the results, graphene oxide with different oxidation levels were synthesized, but the structural quality was better achieved from the control of the sonification process.

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References

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