

Effect of Preparation Temperature on Producing Graphene Oxide by Chemical Oxidation Approach

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Abstract : In this study, the effect of preparation temperature, namely room temperature (RT), 40, 60, and 85°C, on producing of high-quality graphene oxide (GO) has been investigated. GO samples have been prepared by chemical oxidation of graphite via a safe improved chemical technique using a blend of two deferent acids: sulphuric acid (H_2SO_4) and phosphoric acid (H_3PO_4) with volume ratio 4:1, respectively. potassium permanganate ($KMnO_4$) and hydrogen peroxide (H_2O_2) were applied as oxidizing agents. In this work, sodium nitrate ($NaNO_3$) was excluded, so the emission of hazardous explosive gases such as NO_2 and N_2O_2 was shunned. Ice and oil baths were used to carefully control the temperature. Several characterization instruments including X-Ray diffraction, transmission electron microscopy, scanning electron microscopy, electron dispersive spectroscopy, Fourier transform infrared spectroscopy, X-ray photoelectron spectroscopy, and UV-vis spectroscopy were used to study and compare the synthesized samples. The results indicated that GO can be prepared at RT with graphite oxide, and the purity of GO increased with rising of the solvent temperature. Optical properties of GO samples were studied using UV-vis absorption spectra.

Keywords : chemical method, graphite, graphene oxide, optical properties

Conference Title : ICGCEA 2020 : International Conference on Graphene Chemistry and Engineering Applications

Conference Location : Amsterdam, Netherlands

Conference Dates : February 06-07, 2020