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Characterization of graphene synthesized from microwave assisted hydro-thermal methods using graphite oxide prepared from Sri Lanka graphite

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As Sri Lanka exports graphite in the raw form at very low price, it requires a value addition in order to be sold at high prices. In the present study, graphite oxide and graphene were synthesized from local graphite as value added products of graphite. Graphite oxide was synthesized from graphite using a laboratory modified version of the Hummer method, from which graphene was synthesized using microwave assisted hydrothermal methods followed by heat-treatment in inert atmosphere. The prepared products were characterized using X-ray diffraction analysis (XRD), Fourier transformed infra-red (FTIR) analysis and Scanning Electron Microscopy (SEM) techniques. SEM image of the prepared graphene shows distinguishable layers of graphene and the graphite oxide does not show layers as such. In the FTIR spectrum of graphite oxide, the broad FTIR peak at 3414 cm^{-1} is attributed to O–H stretching of structural the OH groups and the disappearance of this peak in the graphene FTIR spectrum indicates conversion of graphite oxide into graphene. On the other hand, XRD spectra show complete conversion of graphite oxide to graphene during the treatments as the characteristic sharp peak at ($2\theta \sim 11^0$) of graphite oxide has shifted to a broad peak at ($2\theta \sim 26^0$) after the treatments, which is characteristic to graphene.

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