

RAPID SYNTHESIS OF GRAPHENE OXIDE USING SRI LANKAN NATURAL VEIN GRAPHITE

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Due to its excellent purity and high crystallinity, Sri Lankan natural vein graphite is a viable contender for industrial-scale applications. Graphene oxide has gained widespread attention in the scientific and industrial communities during the last two decades. However, more attention is needed to introduce and develop new rapid methods in graphene oxide synthesis. This study aimed to synthesize graphene oxide from Sri Lankan natural vein graphite using a modified rapid Tour's method for the first time. Natural vein graphite powder (< 53 µm) of shiny slippery fibrous morphology was added to the mixture of H₂SO₄ and H₃PO₄ (acid ratio 9:1) in an ice bath. Then, KMnO₄ was added and stirred for one hour at 50 °C. The mixture was then poured into ice together with 30% H₂O₂. Prepared graphene oxide was characterized by Raman spectroscopy and FTIR-ATR spectroscopy. The oxidation of graphite is confirmed by the development of the strong D band and the disappearance of the 2D band, as well as the broadening of the G band and the blue shift of the G band in the Raman spectrum. The presence of the bands of hydroxyl, epoxy and other functional groups in the FTIR-ATR spectrum also confirms the successful synthesis of graphene oxide. Accordingly, this approach could produce graphene oxide in less than two hours, which has a high potential for industrial applications. This modified rapid Tour's method can be introduced as a simple and time-efficient method to prepare the graphene oxide.

Keywords: Carbon precursors, Graphene oxide, Rapid Tour's method