

**NANO CARBON MATERIALS BASED ON
PURITY ENHANCED SRI LANKAN FLAKE
GRAPHITE**

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by

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Abstract

Even though there are many studies on Sri Lankan vein graphite, less attention has been paid to investigate Sri Lankan flake graphite. This is partly due to unavailability of high purity flake graphite samples. Besides the deposits present (if) around the country have been not properly identified and located. The flake type of graphite is the main type of graphite available in the other parts of the world, which some countries like China produces at mass scale and is used in number of industrial applications. Although the vein type of graphite available in Sri Lanka has been used in many industrial and research applications ever since they are found, the flake type (if present) has never been explored for its use, mainly due to the problems mentioned above. As vein type is unique to Sri Lanka and has intrinsic properties (that are partly due to geological reasons), one can raise a fair question as to whether the flake type will also have the same uniqueness to SL, hence having intrinsic properties compared to those widely available in other parts of the world (as geology plays a vital role in materials properties). If that is the case, then there is a possibility of developing tailor made applications from SL flake graphite based on properties. However in order to achieve this, one's first target should be to isolate purified flake graphite samples sufficient for a range of investigations. Therefore this research work concentrates on isolation and purification of flake graphite from its deposits and synthesis of carbon based nanomaterials using thus purified flake graphite. The carbon based nanomaterials produced using purified flake graphite are graphene oxide and reduced graphene oxide. The results of this work proved the possibility of purification and the use of this purified flake graphite for the synthesis of graphene based materials.

Flake graphite samples collected from Pasyala area in South Western region were first purified and then were used to synthesis of graphene oxide and reduced graphene oxide. The process was started with the purification of flake graphite powder. Then the chemical oxidation was used to convert the graphite powder into graphene oxide using Improved Hummer's method. Graphene oxide was then

reduced using a chemical reduction method which converted graphene oxide to reduced graphene oxide. The nanocarbon samples were characterized using Fourier Transform Infrared Spectroscopy (FTIR), X-ray diffraction (XRD), Scanning Electron Microscope (SEM), Energy-Dispersive X-Ray Absorption Spectroscopy (EDXAS) and DC electrical conductivity of purified graphite, graphene oxide, reduced graphene oxide was measured using Four-Probe DC conductivity method.