Abstract No: 126 ***Physical Sciences***

SYNTHESIS OF GRAPHENE OXIDE QUANTUM DOTS USING LOCAL GRAPHITE

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Graphene-based quantum dots are zero-dimensional biocompatible nanomaterials that are less than 10 nm in size and it carries distinctive features such as good thermal conductance, excellent mechanical strength, good chemical stability, and excellent electronic properties. Owing to versatile nature of graphene-based quantum dots extensive attention has been gained in many industries to utilize graphene oxide quantum dots (GOQDs). Numerous research efforts have been made so far to develop successful synthesis pathways to obtain GOQDs with desired properties. However, using local Graphite as the precursor material, this study reports an environmentally friendly synthesis route for GOQDs. In this particular method, local graphite power was converted into graphene oxide by improved Hummer's method and the subsequent conversion of graphene oxide to GOQDs using the one-step hydrothermal synthesis approach. The prepared materials were characterized by Ultraviolet-visible (UV-Vis) spectroscopy and ultraviolet transilluminator. According to the UV-vis spectroscopic analysis of graphene oxide showed peaks around 250 nm which is due to $\pi \rightarrow \pi^*$ transitions of the aromatic π electrons. In contrast to that GOQD showed an extra peak at around 340−360 nm which ascribes to the $n \rightarrow \pi^*$ transition of carbonyl bonds or other oxygenated functional groups present on the surface of GOQD. The formation of a quantum dot was confirmed by an ultraviolet transilluminator which gave a light blue color under the UV light. These GOQDs have potential applications in biomedical imaging, adsorption of heavy metals, electronic applications, etc.

Financial assistance from the National Research Council of Sri Lanka (NRC 19-90), all the research assistants, and the technical staff of the NIFS, University of Peradeniya, and JRDC is acknowledged.

Keywords: Graphene oxide, Green approach, Hydrothermal synthesis, Local graphite, Quantum dots