

# Structural Defects in Graphene Quantum Dots: A Review

Ramisha Rabeya<sup>1</sup>, Savisha Mahalingam<sup>1</sup>, Abreeza BTE ABD. Manap<sup>1</sup>, Meenaloshini Satgunam<sup>1</sup>, Md. Akhtaruzzaman<sup>2</sup>, and Chia Hua<sup>2</sup>

<sup>1</sup>Universiti Tenaga Nasional

<sup>2</sup>Universiti Kebangsaan Malaysia

December 8, 2021

## Abstract

Graphene quantum dots (GQDs) are known for their low toxicity, strong fluorescence, high surface area, large solubility and tunable band gaps. However, the change in their properties depends on the preparation processes of GQDs. Thus, certain types of preparation lead to certain defects, such as surface defect, edge defects, Stone-Wales defect. These structural defects are responsible for hindering GQDs to possess their regular shape that affects the morphological properties of GQDs. Thus, the optical and electrical properties get affected. The GQDs, which are synthesized via acidic methods are generally more vulnerable to defects compared to those synthesized using eco-friendly methods. Thereby, the aim of this review is to discuss the causes of structural defects. Moreover, it focuses on how they affect the properties of GQDs and to what extent they affect them. The processes of regulating defects have been elucidated so that more efficient applications can be designed using GQDs with controlled amounts of defects.

## Hosted file

Manuscript.docx available at <https://authorea.com/users/450275/articles/548613-structural-defects-in-graphene-quantum-dots-a-review>

## Hosted file

Figures.docx available at <https://authorea.com/users/450275/articles/548613-structural-defects-in-graphene-quantum-dots-a-review>