

Abstract

Graphene Quantum dots have a very high scope in the upcoming era. These are not only associated with the biotechnological field but are widely used in every other field like medicine, solar cells, and light-emitting diodes. This research includes the environmentally friendly methods of preparation of Graphene Quantum dots using substrates that are cost effective and easily available in the market. Four different sugar substrates i.e., Glucose, Fructose, Maltose and Lactose were chosen for the synthesis of Graphene QDs. The effects of temperature, pH, and concentrations of substrates on the synthesis of Graphene Quantum dots have also been studied. Best conditions are optimized for each substrate to get desired results in the form of highly luminescent GQDs. Furthermore, characterization techniques including UV, FTIR, and photoluminescence have been used to analyze the prepared quantum dots. These characterization techniques confirmed the successful synthesis of Graphene quantum dots. This research also includes the Chemosensing applications of QDs against different explosive materials. Picric Acid proved to be most responsive analyte among others with the maximum quenching efficiency. The quantitative relationship of analyte concentration and emission intensity was also calculated using Stern Volmer

Curve and the Stern Volmer Constant (K_{sv}) was also calculated. Stern Volmer constant values for substrates such as glucose, lactose, maltose, and fructose are 327.67 M^{-1} , 222.62 M^{-1} , 332.54 M^{-1} , and 511.28 M^{-1} respectively.