

Surface Modifications and Analytical Applications of Graphene Oxide: A Review †

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Abstract: Graphene oxide (GO) has attracted substantial research interest owing to its remarkable mechanical and electrical properties. It is prepared using the modified Hummers method and employed as a precursor for synthesizing graphene and graphene-like materials. The facile synthesis of reduced graphene oxide (rGO) and functionalized graphene oxide (fGO) using GO offers extensive opportunities to prepare GO-based inorganic nanocomposites. These composites are designed via the incorporation of different functional nanomaterials and are utilized for diverse practical applications. The surface modification of GO is realized via covalent bonding, noncovalent bonding, and elemental doping. It results in the functionalization of GO with different groups such as C-N, N=N, N-H, and C-O-C. GO-based sensor technologies are extensively applied in numerous detection platforms. These fluorescent, electrical, and electrochemical sensors are utilized primarily for detecting organic, inorganic, and biological materials; in addition, they are applied for bioimaging. The present review provides a holistic summary of the important literary aspects associated with GO and the diverse practical applications of GO.

Keywords: graphene oxide; modification; inorganic nanocomposites; sensing applications.

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Conflicts of Interest

The authors declare no conflict of interest.