

Functionalized graphene-based nanocomposites for smart optoelectronic applications

ABSTRACT

The recent increase in the use of graphene and its derivatives is due to their exceptional physicochemical, electrical, mechanical, and thermal properties as the industrial materials developed by involving graphene structures can fulfill future needs. In that view, the potential use of these graphene-containing nanomaterials in electronics applications has encouraged in-depth exploration of the electronic, conducting, and other functional properties. The protecting undifferentiated form of graphene has similarly been proposed for various applications, for example, as supercapacitors, photovoltaic and transparent conductors, touch screen points, optical limiters, optical frequency converters, and terahertz devices. The hybrid composite nanomaterials that undergo stimulus-induced optical and electrical changes are important for many new technologies based on switchable devices. As a two-dimensional smart electronic material, graphene has received widespread attention, and with that view, we aim to cover the various types of graphene oxide (GO)-based composites, linking their optical and electrical properties with their structural and morphological ones. We believe that the topics covered in this review can shed light on the development of high-yield GO-containing electronic materials, which can be fabricated as the field moves forward and makes more significant advances in smart optoelectronic devices.

Keyword: Graphene oxide; Optical properties of graphene oxide; Graphene synthesis; Functionalized graphene; Optoelectronic devices