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SHORT COMMUNICATION

Organic sensitization of graphene oxide and reduced graphene oxide thin films for photovoltaic applications

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Summary

In this work, a new organic compound (K-Azo) was introduced to enhance the electrical and optical performance of graphene oxide (GO) and reduced GO (rGO) nanostructured films. The improved and modified chemical vapour method was employed for the synthesis of GO and rGO. The photophysical characterization of thin films was performed by applying analytical techniques including X-ray diffraction, Fourier-transform infrared spectroscopy, scanning electron microscopy, ultraviolet-visible, and Raman spectroscopy. The electrical properties (I-V characteristic) of GO and rGO thin films displayed higher conductivity which was 4.07×10^{-7} and 1.10×10^{-3} S/cm, respectively in the presence of organic sensitizer. However, GO and rGO thin films showed 9.91×10^{-7} and 6.17×10^{-4} S/cm, respectively in the absence of K-Azo sensitizer. Optical and electrical investigations indicated that the characteristics of GO and rGO were improved due to the presence of organic sensitizer. The long-range π -electron delocalization in organic sensitizer contributed to higher conductivity for potential photovoltaic solar cell applications.

KEYWORDS

electrical properties, graphene oxide (GO), organic sensitizer, optical properties, photovoltaic (PV), reduced graphene oxide (rGO), solar cells