SONOCHEMICAL SYNTHESIS OF rGO:ZnO COMPOSITES AND THEIR PROPERTIES

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In the recent years, hybridization of graphene materials with nano sized ZnO offers a powerful way to obtain many interesting novel properties over their parent materials. The rGO:ZnO composites have been utilized in various technological fields such as optoelectronics, transparent conducting electrodes, sensors, solar cells, energy and environmental industries. Sonochemical route is a simple and rapid technique to produce rGO:ZnO composite nanostructures and, the size and morphology are depend on different parameters such as input power, frequency, area of emitting surface, intensity, time of irradiation and energy of ultrasound. The present work reports the decoration of ZnO nanostructures on rGO surfaces and the spectroscopic properties. Graphene oxide (rGO) and rGO:ZnO composite structures were prepared by the modified Hummer’s and sonochemical (low frequency 42 kHz ultrasound) methods, respectively. The decoration of ZnO nanostructures on rGO surface were confirmed through transmission electron microscopy (TEM) analysis. Raman and Fourier transform infrared (FTIR) spectra confirmed the formation of composite structures. The absorption spectra of rGO:ZnO hybrid nanostructures exhibited bands at 345 and 261 nm were attributed to the free excitonic absorption of ZnO and of the C–C aromatic rings of rGO, respectively. The prepared materials exhibited excellent photocatalytic properties and the degradation efficiency were significantly improved for the rGO:ZnO composite nanostructures.

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