

Photocatalytic performance of textiles coated with TiO₂-RGO system for degradation of crude petroleum under similar solar irradiation

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The pollution caused by oil and its toxic derivatives presents a considerable risk to the public health and the environment. Here, we studied the influence of TiO₂ nanoparticles immobilized on three types of textiles materials (Cotton, Entretela and PLA) coated with reduced graphene oxide (RGO) to be used for degradation of crude petroleum under simulated solar irradiation. The morphological studies of the functionalized textiles substrates were performed by using Scanning Electron Microscopy and Energy Dispersive X-ray Spectroscopy, which indicated an excellent dispersion and adhesion of nanoparticles on the textile fibres covered with RGO. Ultraviolet-visible Diffuse Reflectance spectra suggests a reduction in the band gap energy of TiO₂ due to the presence of RGO. The excitation/emission Synchronized Fluorescence and Fourier-transform Infrared spectroscopies demonstrated that the functionalized textiles substrates exhibit a great potential for photocatalytic degradation of organic compounds with high prospects in petroleum and wastewater treatment areas.

Keywords: Environmental remediation; Functionalization; Photocatalysis; RGO-TiO₂; Photodegradation of petroleum.