عنوان مقاله:

Decomposition of petroleum contaminants (naphthol) by ultraviolet (UV) radiation using a green-synthetized titanium dioxide (TiO_2) catalyst

محل انتشار:

مجله بین المللی فناوری نانو در آب و محیط زیست, دوره 5, شماره 1 (سال: 1399)

تعداد صفحات اصل مقاله: 11

نویسندگان:

Pantea Arjmandi - *Department of Environmental Science, Faculty of Natrual Resources and Environment, Science and Research branch, Islamic Azad University, Tehran, Iran*

Fariba Hargalani - *Department of Environmental Science, Faculty of Natrual Resources and Environment, Science and Research branch, Islamic Azad University, Tehran, Iran*

خلاصه مقاله:

A simple and eco-friendly method for synthesis nanoparticles is using a green chemistry technique. Also, the utilization of green nanoparticles for the treatment of industrial wastewater could be an outstanding plan to confront environmental pollutions. The novelty of this study was to use leaf extract of Stevia Rebaudiana Bertoni for green synthesized TiO_2 NPs and assessing its functioning for the photocatalytic treatment of Naphthol from real sample wastewater in a self-designed photoreactor. The amount of nano-adsorbent changes was studied under different conditions such as the amount of naphthol concentration, pH, and time period of degradation. Results: The results of the XRD showed that the Anatase and Rutile phase of TiO_2 conformed to cards no.JCPDS21-1272 and no.JCPDS21-1276 respectively. The EDX analysis illustrated the existence of TiO_2 with a weight percentage of 50.17 wt.% for Ti and 49/83 for O. The size of the particles in the SEM photo was found to be about 17nm. The removal of naphthol content was measured by the UV-Vis method. The optimum pH for naphthol removal by TiO_2 is pH = 9, the optimal contact time is 20 min, and the optimal concentration of Naphthol is 3 mg/L. Comparing the Freundlich and Langmuir adsorption isotherm models revealed that the absorption model in this study is in complete conformity with the Freundlich adsorption model. This study affirms that the green synthesis of Stevia leaf extracted is a modern beneficial procedure for the preparation of TiO_2 nanoparticles. This method is straightforward, cost-effective, eco-friendly, and rapid.

کلمات کلیدی:

(Photocatalytic degradation, Organic contaminants, Green synthesis, Nano-titanium dioxide (TiO_2