

عنوان مقاله:

Photocatalytic Activity Studies of Iron Titanate (FeTiO₃) Nanoparticles towards the Removal of Various Chloro Phenols under Visible Light Irradiation
Service Unavailable

محل انتشار:

فصلنامه روشهای تصفیه محیط، دوره 9، شماره 4 (سال: 1400)

تعداد صفحات اصل مقاله: 0

نویسندگان:

Rambabu Thokachitchu - Research Scholar, Dept. of Engineering Chemistry, AU College of Engineering (A), Andhra University, Visakhapatnam-530003, Andhra Pradesh, India

Paul Douglas Sanasi - Associate Professor & Head, Department of Engineering Chemistry, AU College of Engineering (A), Andhra University, Visakhapatnam-530003, Andhra Pradesh, India

خلاصه مقاله:

The photocatalytic removal of organic pollutants has been recognized as an important research area, in the field of wastewater treatment techniques. In this regard, a novel iron titanate, FeTiO₃ nanoparticles (NPs) were synthesized by a facile sol-gel method. Three different combinations of NPs have been synthesized, having a constant atom % of iron, and variable atom % of titanium. The calcinated samples were characterized using XRD, FESEM-EDAX, UV-Vis DRS, and N₂ adsorption-desorption techniques. The physicochemical characteristics such as crystal structure, morphology, atom efficiency, absorption wavelength, bandgap (electron volts, eV), and specific surface area (SBET, m².g⁻¹) were clearly analyzed and confirmed. Majorly, the bandgap has decreased with an increase in the Ti % from FeTi-0.5 to FeTi-2.0 NPs, and hence the visible light absorption capacity of the NPs has increased. Furthermore, the specific surface area of the NPs, has also increased, with an increase in the Ti %. It clearly shows the increase in the adsorption capacity of the NPs. The effectiveness of these NPs, to act as visible light-sensitive photocatalysts was investigated towards the removal of certain hazardous organic pollutants like 2-chlorophenol, 2,4-dichlorophenol, and 2,4,6-trichlorophenol. The experiments were conducted to evaluate the effect of initial pollutant concentration, the effect of photolysis, catalysis, and photocatalysis, the composition of the NPs, and the effect of pH, towards the removal of the pollutants. In these studies, the FeTi-2.0 NPs have shown superior photocatalytic activity, owing to their narrow bandgap and high specific surface area. Using this photocatalyst, the scavengers experiment and COD studies were conducted. It was observed that the hydroxyl radicals (OH•) and the superoxide radical ions (O₂•-), were the active species involved in the removal of the pollutants. The % COD loss was observed to be almost 90 % for all the organic pollutants. The photocatalytic removal of organic pollutants has been recognized as an important research area, in the field of wastewater treatment techniques. In this regard, a novel iron titanate, FeTiO₃ nanoparticles (NPs) were synthesized by a facile sol-gel method. Three different combinations of NPs have been synthesized, having a constant atom % of iron, and variable atom % of titanium. The calcinated samples were characterized using XRD, FESEM-EDAX, UV-Vis DRS, and N₂ adsorption-desorption techniques. The physicochemical characteristics such as crystal structure, morphology, ... atom efficiency, absorption wav

کلمات کلیدی:

irontitanate, photocatalysis, bandgap, specific surface area, chlorophenols

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/2052923>



