Photocatalysis Degradation of Oil-Polluted Water Enhancement via Pickering Emulsion Stabilized by TiO2

Zhang, Mingyi (School: The Experimental High School Attached to Beijing Normal University)

Pickering Emulsions(PE), which received growing endorsement in the recent catalytic chemistry field due to its high surface activity, provide new possibilities to improve the efficiency of TiO2 light catalysis in degrading soluble pollutants in water. In this study, the PVA-hybridization method and methyl orange pretreatment are utilized to change the photoresponse to visible light spectrum and wettability of nanoparticles to form the emulsion. In this sense, a Pickering Emulsion system stabilized by PVA hybridized, methyl orange pretreated TiO2 nanoparticles is obtained and has both visible light photoreaction and optimal photocatalysis capabilities. The experimental results showed that the catalyst obtained by this method achieved a high visible light catalytic activity and persistence by completely degrading the configured methyl orange solution within 3 h for the first time under experimental conditions under long-term visible light irradiation and only 34.98% volume expansion after 9 h continuous irradiation. The model designed in the paper enhances the ability of photocatalysis and became more durable and long-lasting in a clean and environmental-friendly way.

Awards Won:
American Chemical Society: Certificate of Honorable Mention