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NaBiO₃ Photocatalysis for Environmental Remediation, dye and drugs remotion.

The raising of emergent contaminants is characterized by a detrimental effect on the quality of water, soil and air, affecting the wellbeing of many types of organisms and the difficulty of their degradation by conventional methods. Research about the harmful effects of these substances show that although they cannot be acutely toxic in the early term, there are potential risk against reproductive processes of aquatic lifeforms, cytotoxic and genotoxic effects, high oxidative cell stress, and adverse effects on growth rate. Furthermore, the problem aggravates by the low regulation in both, consumption and residual treatment, and the poor removal efficiency of wastewater treatment plants. One way to make a stand against this alarming situation is the use of an Advanced Oxidation Process (AOP), such as photocatalysis. NaBiO₃, a semiconductor catalyst, has been regarded as an 'excellent' catalyst for this kind of application in recent years as a result of its outstanding properties including fast charge carrier separation, visible-light absorption and chemical stability. In this research it is presented the photocatalytic performance of NaBiO₃ in the remotion of emergent contaminants (Rhodamine B, Ciprofloxacin and Ibuprofen). The synthesis was carried out by a conventional coprecipitation technique using bismuth nitrate (Bi(NO₃)₃) and sodium hydroxide (NaOH) as Bi and Na sources. X-Ray Diffraction (XRD) and Diffuse Reflectance Spectroscopy (DRS) were performed to characterize the sample. Photocatalysis experiments measured the loss on intensity of the characteristic peaks of the contaminant. Total RhB decolorization was achieved in 90 minutes, meanwhile the ciprofloxacin solution was removed about 50 % in 150 minutes, in contrast, ibuprofen was not degraded due to the oxidation and reduction potentials of NaBiO₃.

Keywords

sodium bismuthate, emergent contaminants, photocatalysis, environmental remediation

Reference

W. Wu and & H. Zhou. One-pot preparation of NaBiO₃/PNMA composite: surface properties and photocatalytic performance. Applied Surface Science 544 (2021) , 148910 <https://doi.org/10.1016/j.apsusc.2020.148910>.

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Author approval

I confirm

Author will attend

I confirm

Author: VALENCIA-CRUZ, Diego (UPIITA-IPN)

Co-authors: Mr CORREA-LOZANO, Angel (UPIITA-IPN); Mr FLORES-RAMÍREZ, Daniel (UPIITA-IPN); Dr ROMERO-IBARRA, Issis Claudette (UPIITA-IPN)

Presenter: VALENCIA-CRUZ, Diego (UPIITA-IPN)

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