$BaTiO_3/TiO_2$ Nanocomposite for Piezo-Photocatalytic Wastewater Treatment

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The piezo-photocatalysis has attracted much attention for wastewater treatment, especially for the degradation of organic pollutants and disinfection of microbes. Among various wastewater treatment, the degradation of organic contaminants through photocatalyst and piezocatalyst is a green and environmentally friendly method. Therefore, we propose to combine the photosensitive properties of photocatalysts to develop photocatalyst materials with piezoelectric vibrations, pursue to reduce the harm to the environment while generating pollution, and finally achieve a balance of net zero pollution. In this study, we developed a series of $BaTiO_3/TiO_2$ nanocomposites by the hydrothermal synthesis. The photo-assisted Kelvin probe force microscopy was used to reveal the assessment of surface charge accumulation after irradiation as different light sources strike $BaTiO_3/TiO_2$ nanocomposites with different wavelengths. $BaTiO_3/TiO_2$ nanocomposites exhibits the highest piezo-photocatalytic activity and can degradation of antibiotics (Tetracycline) and organic dye (Methyl Orange), and their averaged degradation rate constant can achieve 26.62×10^{-3} min^{-1} and 17.82×10^{-3} min^{-1}, respectively. $BaTiO_3/TiO_2$ nanocomposite exhibits high potential as a piezo-photocatalyst for degradation of organic pollutants and disinfection of microbes, and sheds light on the possibility of solving environmental contamination.

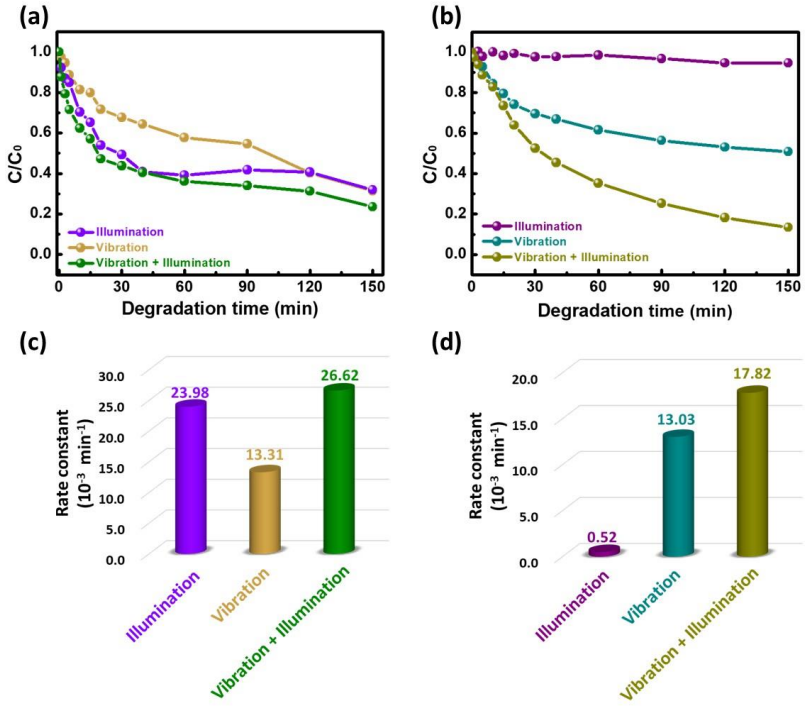

Fig. C/C_0 curves for degradation of **(a)** methyl orange and **(b)** tetracycline with different treatments, and the bar charts of degradation reaction rate constant of **(c)** methyl orange and **(d)** tetracycline with different treatments.