

Synthesis of hierarchical porous $\text{Bi}_2\text{O}_3/\text{CeO}_2$ microsphere for photocatalytic degradation of orange II dye

J. J. Wu, S.H. Hsieh, G.J. Lee, C.Y. Chen, J.H. Chen, S.H. Ma, T.L. Horng and K.H. Chen
Feng Chia University, Taiwan

Growing concerns about environmental problems has led many researchers to seek for efficient ways to remove pollutants. Bismuth oxide (Bi_2O_3) is an attractive material due to its good electrical conductivity, thermal properties, and narrow band-gap (2.8 eV). Recently, many research efforts have been focused on developing various morphologies of Bi_2O_3 and modified with transition metals to improve photocatalytic activity. New visible light responsive hierarchical $\text{Bi}_2\text{O}_3/\text{CeO}_2$ microspheres, which are assembled from nanosheets with nanopore structure, have been successfully synthesized in this study by hydrothermal method in ethylene glycol (EG) without using templates. $\text{Bi}_2\text{O}_3/\text{CeO}_2$ catalysts were formed by $\text{Bi}(\text{NO}_3)_3 \cdot 5\text{H}_2\text{O}$ and $\text{Ce}(\text{NO}_3)_3 \cdot 6\text{H}_2\text{O}$ at 120, 150, and 180°C. Techniques of X-ray diffraction (XRD), Field emission scanning electron microscopy (FESEM), transmission electron microscopic (TEM), and diffuse reflectance ultraviolet-vis spectra (UV-DRS) were employed to characterize the as-synthesized materials. The results showed that the microstructure and morphology of $\text{Bi}_2\text{O}_3/\text{CeO}_2$ composites were similar in spite of different inverse proportion. According to the optimization results, it could be concluded that the formation of $\text{Bi}_2\text{O}_3/\text{CeO}_2$ composite photocatalyst is more effective than pure Bi_2O_3 photocatalyst by acquiring better photocatalysis activities induced by harvesting visible light.

Biography

Jerry J. Wu has completed his Ph.D at the age of 29 years from the Department of Civil and Environmental Engineering in Michigan State University. He is currently a professor at the Department of Environmental Engineering and Science in Feng Chia University in Taiwan. He has published more than 40 papers in reputed journals and is also serving as an editorial board member of American Journal of Environmental Engineering.

jjwu@fcu.edu.tw