

Green Synthesis and Photo Catalytic Activity of Monoclinic α -Bi₂O₃ Nanocrystals

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Abstract : Visible light driven monoclinic α -Bi₂O₃ photocatalyst was synthesized employing green synthesis method using rambutan peel wastes. 10 ml rambutan extract was added to 50 ml of 0.1M Bi(NO₃)₃ under stirring at about 80°C for 2 hours. The centrifuged and dried product was calcinated in a muffle furnace at 450°C to get pure α -Bi₂O₃. The characterized product photocatalytic activity was evaluated employing methyl orange (MeO) as model pollutant with 10 mg l⁻¹ concentration at pH 7. The obtained product optical absorption edges located at 484 nm clearly revealed the photocatalyst excitation by visible light irradiation. The obtained yellow color photocatalyst accord with its strong absorption spectrum revealed the visible light absorption due to the band gap transition. The band gap energy of α -Bi₂O₃ was estimated to be 2.81 eV indicating the absorption of α -Bi₂O₃ in visible light region. The photocatalytic results of MeO degradation revealed that green synthesized Bi₂O₃ can effectively degrade 92% MeO within 240 min under visible light (>400 nm), which is slightly increased to that of chemically synthesized Bi₂O₃ (90%).

Keywords : green synthesis, bismuth oxide, photocatalytic activity, nano

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