

Photocatalytic activity meso -porous zirconia nanoparticles modified with BiOI under simulated solar light irradiation

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BiOI modified zirconia (BiOI-ZrO₂) nanoparticles were fabricated using precipitation-deposition method. The physicochemical properties of BiOI/ZrO₂ were studied through X-ray diffraction pattern (PRD), field emission scanning electron microscopy (FE-SEM), transmission electron microscopy (TEM), B.E.T-surface area, X-ray photoelectron spectroscopy (XPS), UV-vis diffuse reflectance spectroscopy (UV-vis-DRS) and photoluminescence (PL) spectroscopy techniques. The absorption maximum of ZrO₂ was shifted to the visible region after sensitization with BiOI. B.E.T. surface area results inferred that the prepared hetero-junctions were meso-porous in nature. The photocatalytic activity of BiOI-ZrO₂ toward the degradation of methyl violet (MV) dye under simulated solar light irradiation was investigated in detail. It was revealed that 3% BiOI-ZrO₂ exhibited higher photocatalytic performance (98% of MV degradation) compared with ZrO₂ and BiOI. The enhancement in the photocatalytic activity of BiOI-ZrO₂ was contributed by the sensitization effect of BiOI, suppression of electron-hole recombination and the formation of p-n heterojunction.