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Synthesis of Fe_2O_3/BiOBr Heterostructures with Improved Visible Photocatalytic Activity and Enhanced Stability

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Abstract—*Fe_2O_3/BiOBr were synthesized by a hydrothermal approach and were implemented as visible light driven photocatalysts for the degradation of RhB under visible light irradiation. The synthesized products were characterized by scanning electron microscopy (SEM), X-ray diffraction (XRD), Transmission electron microscopy (TEM), UV–vis diffuse reflectance spectroscopy (DRS), FTIR, N_2 adsorption-desorption isotherms (BET) and photoluminescence technique. In order to evaluate the photocatalytic activity of as prepared samples, RhB was selected as a probe molecule. The synthesized hybrids showed extended light absorption and displayed superior photocatalytic activity towards the degradation of RhB under visible light irradiation. The enhanced photocatalytic activity of as prepared samples was attributed to the efficient charge separation across the heterojunction interface. Trapping experiments in presence of quenchers were carried out to propose a mechanistic pathway produced during photocatalytic oxidation process of dyes. The cyclic runs were also carried out to determine the stability of as prepared heterostructures. The as-synthesized samples showed great stability and did not show any significant loss of activity even after 5 cyclic runs.*

Keywords*: heterostructure, photocatalytic Oxidation, Rhodamine B (RhB), composites, hydrothermal, cyclic runs.*