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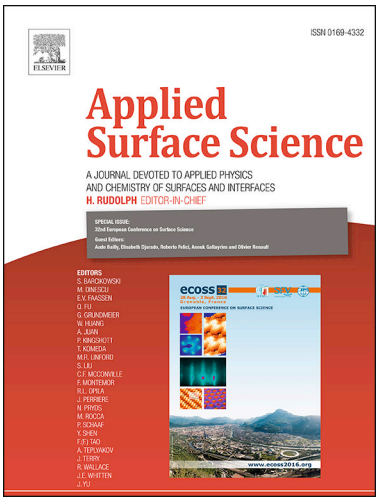

Full Length Article

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Novel indirect Z-scheme photocatalyst of Ag nanoparticles and polymer polypyrrole co-modified BiOBr for photocatalytic decomposition of organic pollutants

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Abstract: Mimicking the natural photosynthesis, artificial Z-scheme photocatalysis enables more efficient utilization of solar energy for degradation of organic pollutants. Herein, an indirect Z-scheme photocatalyst of Ag nanoparticles and polymer polypyrrole (PPy) co-modified BiOBr was rationally designed and successfully synthesized via a combination of hydrothermal technique, in-situ photo-reduction and oxidative polymerization method. Dramatically, BiOBr-Ag-PPy system showed superior photocatalytic performance and excellent stability in degradation of both the typical triphenylmethane dye (malachite green) and colorless organic compound (phenol). Especially for BAP-0.4, its degradation conversion of malachite green was 6.4, 2.4 and 1.6 times of those of pure BiOBr, BiOBr-Ag and BiOBr-PPy, respectively, and can still maintain more than 91% even after fifth cycle experiment. The trapping experiments of reactive species and electron spin resonance (ESR) tests confirmed that the $\bullet O_2^-$ and h^+ were main active species in photocatalytic degradation. Through experimental investigations and theoretical analyses, the possible charge carriers transfer process over BiOBr-Ag-PPy ternary Z-scheme photocatalyst was

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