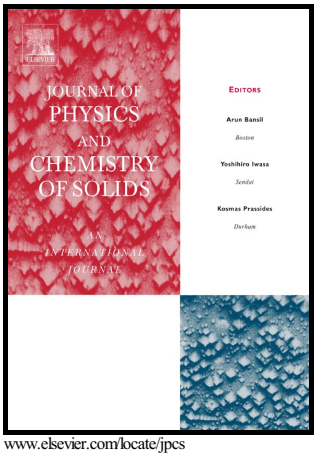

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Abstract

The new multifunctional composite Fe_3O_4@SiO_2@Bi_2WO_6@g-C_3N_4 (FSBG) hierarchical microspheres with Bi_2WO_6/g-C_3N_4 heterostructure as an outer shell and Fe_3O_4@SiO_2 as a magnetic core have been synthesized and characterized for photocatalytic applications. An efficient and adoptable approach of synthesizing magnetic Bi_2WO_6/g-C_3N_4 hierarchical microspheres of grape-like morphology is realized. The as-synthesized structures exhibit highly efficient visible-light absorption and separation efficiency of photo-induced charge. The visible-light-induced photocatalytic activity of g-C_3N_4, Fe_3O_4@SiO_2@Bi_2WO_6, and FSBG is evaluated by investigating the photodegradation of Rhodamine B (RhB) and hydrogen (H_2) out of water. The comparative study reveals that the FSBG microspheres exhibit an optimum visible-light-induced photocatalytic activity in degrading Rhodamin B (RhB), which is 3.06 and 1.92 times to that of g-C_3N_4 and Fe_3O_4@SiO_2@Bi_2WO_6 systems respectively and 3.89 and 2.31 times in the production of hydrogen (H_2) out of water, respectively. The FSBG composite microspheres also exhibit good magnetic recoverability. An alternate mechanism for the enhanced