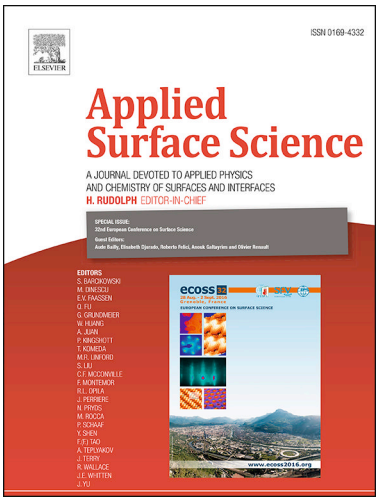

Full Length Article

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Mechanochemical synthesis of novel heterostructured Bi_2S_3/Zn-Al layered double hydroxide nano-particles as efficient visible light reactive Z-scheme photocatalysts

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Abstract

Herein, we demonstrated, for the first time, the synthesis of novel Z-scheme heterostructures of Bi_2S_3/Zn–Al LDH nanoparticles via a mechanochemical route, and the high efficiency as visible-light-driven photocatalysts for the degradation of organic pollutant of methylene blue dye (MB). The samples were characterized comprehensively by a set of analytical methods: XRD, XPS, FTIR, UV/VIS/NIR spectroscopy, SEM-EDS, BET measurement, EIS analysis, PL measurement, ESR, Hall Effect measurement and quantitative evaluation of photocatalytic degradation of MB under visible light irradiation. Compared with the pure Bi_2S_3, greatly enhanced photocatalytic activity from the Bi_2S_3/LDH nanoparticles was observed and a possible mechanism ascribed to the formation of Z-scheme was discussed based on the well matching results from the characterizations by different methods. No obvious decrease in the activity was observed with the reused examination. The easy preparation of the efficient LDH-based Z-scheme photocatalytic systems through