

 论文摘要

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S与金属共掺杂TiO₂催化剂的制备及其光催化性能顾凌燕¹, 王玉萍^{1,2}, 彭盘英¹, 王连军²(1. 南京师范大学 化学与环境科学学院, 南京 210097;
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摘要: 采用溶胶-凝胶法制备S、Mo、Pt、Fe掺杂以及S/Mo、S/Fe、S/Ag共掺杂的TiO₂粉末, 利用XRD、XPS和UV-Vis等技术对样品进行表征; 以1-萘酚-5-硫酸(L-酸)为目标物, 考查紫外和可见光源下各催化剂的光催化活性。结果表明: 除S/Ag-TiO₂外, 其余掺杂TiO₂均为单一的锐钛矿相, 掺杂后催化剂的吸收带边发生明显红移; 对10 mg/L的L-酸进行降解, 在可见光下, S-TiO₂光催化活性较好, 而在紫外光下, S/Ag-TiO₂的光催化活性较好; 经XPS分析发现, 掺杂元素掺入到TiO₂晶体中, 使Ti_{2p}结合能减小。S的掺杂不仅使S-TiO₂样品的光催化活性增大, 同时也提高了金属与S共掺杂样品的光催化活性。

关键词: 金属掺杂; 硫掺杂; 共掺杂; 可见光; 光催化Preparation of S and metal co-doped TiO₂ and their photocatalytic activitiesGU Ling-yan¹, WANG Yu-ping^{1,2}, PENG Pan-ying¹, WANG Lian-jun²(1. School of Chemistry and Environmental Science, Nanjing Normal University, Nanjing 210097, China;
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Abstract: S-, Mo-, Pt-, Fe-doped, and S/Mo, S/Fe, S/Ag co-doped TiO₂ nanoparticles were synthesized by sol-gel method. The doped TiO₂ photocatalysts were characterized by XRD, XPS and UV-Vis, and the photocatalytic activities were evaluated by photodegradation of 1-naphthol-5-sulfonic acid (L-acid) under ultraviolet and visible light radiation. The results show that the crystal form of all catalysts is single anatase except S/Ag-TiO₂, and the absorption band of all doped-TiO₂ is red shift. For photodegradation of 10 mg/L L-acid, photocatalytic activity of S-TiO₂ is better under the visible light irradiation, while the photocatalytic activity of S/Ag-TiO₂ is better under the ultraviolet light irradiation. All doping elements are doped in the crystal of TiO₂ and reduce Ti_{2p} binding energy from X-ray photoelectron spectra (XPS). The sulfur element doping not only increases the photocatalytic activity of the S-TiO₂ sample, but also simultaneously enhances the photocatalytic activity of sulfur element and metallic element co-doping the sample.

Key words: metal-doping; S-doping; co-doping; visible-light; photocatalysis

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