

论文

Pb-N共掺杂TiO<sub>2</sub>纳米晶的制备、表征及光催化性能的研究

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摘要:

通过溶胶凝胶法制备了Pb掺杂TiO<sub>2</sub>纳米晶、在管式炉中NH<sub>3</sub> (67%) /Ar气氛下制备N掺杂及Pb-N共掺杂的TiO<sub>2</sub>纳米晶, 利用XRD, XPS, SEM及UV-VIS对样品进行了表征, 并研究了样品对甲基橙溶液的降解. 结果表明: Pb掺杂可以降低纳米晶的粒径, Pb-N共掺杂可以起到协同作用, 降低样品的带隙能, 提高样品对可见光的吸收, Pb-N共掺杂的TiO<sub>2</sub>在可见光作用下表现出较高的催化活性, 0.5% Pb-N共掺杂的TiO<sub>2</sub>, 可将20mg/L的甲基橙水溶液在35min内完全降解.

关键词: 二氧化钛 共掺杂 制备 光催化

Preparation, characterization and photo-catalysis of TiO<sub>2</sub> nanoparticles co-doped with nitrogen and plumbum

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Abstract:

The Pb doped titanium dioxide nanoparticles were prepared by the sol-gel method. Nanoparticles of TiO<sub>2</sub> powder co-doped with Pb and N were prepared using a sol-gel method followed by being calcined for two hours at a temperature ranging from 500 to 600°C in a NH<sub>3</sub>/Ar atmosphere. Particle appearances were characterized by XPS, XPS, SEM and UV-VIS, and the photo-catalysis of TiO<sub>2</sub> was studied by degrading methyl orange. Results indicate that Pb doping could decrease the particle size of nanoparticles, and Pb-N co-doping has a synergistic effect that could decrease the band gap energy and increase the visible absorption capacity of samples. Pb-N co-doped TiO<sub>2</sub> appears to have higher photo-catalysis activity under visible light than TiO<sub>2</sub> and Pb doped TiO<sub>2</sub>. 0.5% Pb-N co-doped TiO<sub>2</sub> could degrade aqueous methyl orange (20mg/L) within 35minutes.

Keywords: titanium dioxide co-dope preparation photo-catalysis

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