

不同晶型纳米TiO<sub>2</sub>的溶剂热合成及其光催化活性研究

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**摘要** 采用不同的醇溶剂, 以六亚甲基四胺为沉淀剂, 以TiCl<sub>3</sub>为先驱体, 通过溶剂热的方法控制合成出纳米级的锐钛矿型、金红石型和板钛矿型的二氧化钛. 通过XRD、TEM、UV-Vis光谱和XPS能谱对其进行了表征, 研究了醇的种类、

六亚甲基四胺的量对二氧化钛相组成及光催化性能的影响. 结果发现, 以甲醇为溶剂,

酸性条件有利于生成锐钛矿相, 碱性条件有利于生成金红石相和板钛矿相.

溶剂热条件下可以得到氮掺杂的TiO<sub>2-x</sub>N<sub>x</sub>.

光催化降解甲基橙活性结果表明锐钛矿和板钛矿混晶具有最好的光催化活性.

**关键词** [溶剂热](#) [二氧化钛](#) [相组成](#) [光催化](#)

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## Solvothermal Synthesis of Nanosized TiO<sub>2</sub> particles with Different Crystal Structures and Their Photocatalytic Activities

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**Abstract** Nanosized titania particles consisting of anatase, rutile and brookite phases were synthesized under solvothermal conditions with different alcohols as solvents, hexamethylene tetramine (HMT) as precipitant as well as precursor of titanium trichloride. XRD, TEM, UV-Vis and XPS spectra were employed to characterize these samples. The effect of treatment solvent and HMT amount on the phase composition and photocatalytic activity of titania were investigated. It is found that anatase is easier to form at acidic condition, but rutile and brookite at basic condition, using methanol as solvent. The TiO<sub>2-x</sub>N<sub>x</sub> with nitrogen doping in TiO<sub>2</sub> is obtained under solvothermal conditions. The results of photocatalytic degradation to methyl orange show that the mixed crystallite of anatase and brookite has the best photocatalytic activity.

**Key words** [solvothermal synthesis](#) [titania](#) [phase composition](#) [photocatalysis](#)

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