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液相沉积法制备光催化活性**TiO2**薄膜和纳米粉体

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摘要 采用液相沉积法，在35℃通过向六氟钛酸铵水溶液中添加硼酸和结晶诱导剂锐 铁矿型TiO2纳米晶，沉积出具有光催化活性的Ti02薄膜和纳米粉体．用XRD，AFM， 阶梯仪,UV-vis，BET法对Ti02薄膜和粉体的沉积条件、结构、厚度和性能进行了测 定和表征，并用亚甲兰的降解，评价了TiO2薄膜和纳米粉体的光催化活性．结果表 明，当反应物六氟钛酸铵与硼酸的摩尔比为1：2—1：4时，沉积的粉体和薄膜含有 锐钛矿相Ti02；经300℃热处理的Ti02薄膜和纳米粉体具有最高的光催化活性，它的光催化活性是未经热处理前的5倍．本文还解释了经300℃热处理的薄膜和纳米粉体具有最高光催化活性的原因．

关键词 沉积 光催化 氧化钛 薄膜 亚甲兰 六氟钛酸铵 硼酸

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Photocatalytic Activity of TiO_2 Thin Films and Nano-powders Prepared by Liquid Phase Deposition (LPD)

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Abstract Titanium oxide thin films and nano-powders with photocatalytic activities were prepared via liquid-phase deposition (LPD) method by adding H3BO3 into an (NH4) 2TiF6 solution supersaturated with anatase nano-crystaUine TiO2 at 35 ℃. The effects of the deposition conditions on the structure, surface morphology, thickness and performance of the deposited TiO2 thin films and powder were studied by XRD, AFM, step profilometer, UV-Vis and BET methods. Photocatalytic activity of the TiO2 thin films and powder was evaluated by degradation of methylene blue. The results indicate, when molar ratio of TiF2-6-/H3BO3 was set at 1:2 ~ 1:4, anatase TiO2 was found in the prepared powder and the deposited thin films. Degradation of methylene blue reached its maximum for both thin films and powder calcined at 300 ℃, which was 5 times higher than that deposited at 35℃. The mechanism of the appearance of the strongest photocatalytic activity at 300 X, was also discussed.

Key words SEDIMENTATION PHOTOCATALYSIS TITANIUM OXIDE THIN FILMS METHYLENUM CAERULEUM (NH4) 2TiF6 BORIC ACID

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