

不同波长紫外光照下纳米TiO₂薄膜的光致亲水性与循环伏安行为

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摘要 通过溶胶-凝胶方法分别在ITO和玻璃表面制备了纳米TiO₂薄膜,研究了纳米 TiO₂薄膜在254及365nm的紫外光照射下的循环伏安行为和光致超亲水性。在紫外光的照射下, TiO₂薄膜电极可表现出两个光电化学过程, 纳米TiO₂薄膜的光致超亲水性转变及两个光电化学过程的速率均取决于紫外光的波长, 原因在于纳米 TiO₂薄膜对两种波长的光的吸收率和光子的能量不同。提出了光电化学过程的机理, 认为紫外光照射下纳米TiO₂薄膜的超亲水性变化与产生Ti~(3+)的过程引起的表面微观结构变化存在的一定的内在联系。

关键词 [氧化钛](#) [薄膜](#) [循环伏安法](#) [亲水性](#) [微观结构](#)

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Photo-induced Hydrophilicity and Cyclic Voltammetric Behavior of TiO₂ Thin Film under Ultraviolet Illumination with Different Wavelengths

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Abstract TiO₂ thin films were prepared by a sol-gel method on ITO and glass substrates. The hydrophilicity change under two wavelength UV light was investigated by the determination of the contact angle of water. Cyclic voltammetric behavior of ITO/TiO₂ electrode under ultraviolet (UV) illumination with different wavelength was measured in the solution of Na₂SO₄. Two photoelectrochemical processes for TiO₂ thin film electrode under UV illumination can be observed. The conversion rates of hydrophilicity of the TiO₂ thin film and the two photoelectrochemical processes were determined by the wavelength of the UV light. The main reason is that ultraviolet light with short wavelength has high energy and absorbance. A mechanism was proposed on the base of these two photoelectrochemical processes. It is assumed that the change of hydrophilicity of the films was related with the changes of surface structure when the film was irradiated by UV light.

Key words [TITANIUM OXIDE](#) [THIN FILMS](#) [CYCLOVOLTAMMGRAPH](#) [HYDROPHILICITY](#) [MICRO-STRUCTURE](#)

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