

纳米Cu₂O/TiO₂ 异质结薄膜电极的制备和表征

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摘要 通过阴极还原在纳米TiO₂膜上电沉积Cu₂O, 获得了p-Cu₂O/n-TiO₂异质结电极.

研究了沉积温度对Cu₂O膜厚、纯度和形貌的影响, 制备出纯度较高、粒径为40~50nm的Cu₂O薄膜.

纳米Cu₂O膜在200℃烧结后透光性最好, 禁带宽度为2.06eV. 光电化学测试表明纳米p-Cu₂O/n-TiO₂

异质结电极呈现较强的n-型光电流响应并且能够提高光电转换效率.

关键词 [氧化亚铜薄膜](#) [二氧化钛膜](#) [异质结电极](#) [光电化学](#)

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Preparation and Characterization of Nanocrystalline Cu₂O/TiO₂ Heterojunction Film Electrode

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Abstract

TiO₂ film; heterojunction electrode; photoelectrochemistry This paper introduced the electrochemical deposition of Cu₂O thin films on TiO₂ films by cathodic reduction to form p-Cu₂O/n-TiO₂ heterostructure electrode. The effects of bath temperature on film thickness, purity and morphology of Cu₂O films were studied. Pure spherically shaped Cu₂O grains with 40~50nm diameter were obtained. It is found that annealing at 200℃ can improve the spectral transmittance of the Cu₂O film and the film has a band gap of 2.06eV. The measurements of photoelectrochemical behavior of the nanocrystalline p-Cu₂O/n-TiO₂ heterostructure electrode show that such heterostructure electrode produces strong n-type spectral response and can improve the photoelectron conversion efficiency.

Key words [TiO₂ film](#) [heterojunction electrode](#) [photoelectrochemistry](#)

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