过程工程 2007 7 (5): 1022-1028 ISSN: 1476-8186 CN: 11-5350/TP 首页 当期目录 上一期 下一期

材料工程专栏

Preparation and Photoelectrochemical Performance of Potassium Hexatitanate Nanofilm

钱清华,刘畅,胡煜艳,杨祝红,冯新,陆小华

南京工业大学化学化工学院

收稿日期 修回日期 网络版发布日期 接受日期

摘要 Nanostructured K2Ti6O13 film photoelectrode produced in situ was prepared on indium-tin oxide (ITO) glass substrate by a sol-gel process and characterized by thermogravimetry (TG) and differential scanning calorimetry (DSC), X-ray diffraction (XRD), atomic force microscopy (AFM), UV-Visible diffuse reflectance and Raman spectrometry. The photoelectrochemical performance of K2Ti6O13 film was assessed by electrochemical method. The analytical results showed that the K2Ti6O13 film had a strong and wide absorption in the ultraviolet and visible light range. The band gap energy (Eg) of the film shifted from 3.45 eV (bulk) to 3.05 eV (film). The flat-band potential (Efb) of K2Ti6O13 film was -0.67 V [vs. saturated calomel electrode (SCE)]. The transport of photogenerated electrons and holes was better in K2Ti6O13 film electrode than that in TiO2 film electrode. The photoelectrochemical response of K2Ti6O13 photoelectrode was increased in electrolyte solution with KOH, compared with that in the solution without KOH. The adsorption of OH- on the nanofilm acted as the surface activity center. The mechanism of photolysis was analyzed in terms of photoelectrochemical behavior.

关键词 potassium hexatitanate film,sol-gel process,atomic force microscopy,photoelectrochemical performance

分类号

DOI:

对应的英文版文章:206564

通讯作者:
qinghua@mail.lygtc.net.cn
作者个人主页: 钱清华;刘畅;胡煜艳;杨祝红;冯新;陆小华