

### 论文摘要

中国有色金属学报

ZHONGGUO YOUSEJINSHUXUEBAO XUEBAO

第17卷 第10期 (总第103期) 2007年10月

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文章编号: 1004-0609(2007)10-1711-07

## 焙烧温度对K<sub>2</sub>Ti<sub>6</sub>O<sub>13</sub>薄膜光电化学和光催化的影响

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**摘要:**采用溶胶凝胶法在导电玻璃上制备K<sub>2</sub>Ti<sub>6</sub>O<sub>13</sub>薄膜, 考察焙烧温度对薄膜结构和光催化、光电化学行为的影响。采用XRD和AFM测定晶体和表面结构; 以自组装在薄膜表面的十八烷基三氯硅烷(OTS)为光催化降解对象, 评价K<sub>2</sub>Ti<sub>6</sub>O<sub>13</sub>薄膜光催化氧化性能; 通过计时电位, 循环伏安和光电流表征薄膜中光生载流子行为。结果表明, 合适的结晶度和晶粒尺寸的匹配使500 °C焙烧的K<sub>2</sub>Ti<sub>6</sub>O<sub>13</sub>薄膜具有较高的载流子激发、分离和迁移能力, 体现出最高的光催化氧化能力和最大的光电流, 光催化性能优于TiO<sub>2</sub>薄膜。由光电测试计算得其在254 nm光照下光电量子效率约为6.9%

**关键字:** 六钛酸钾薄膜; 光催化; 光电化学

## Effect of calcined temperature on photoelectrochemical and photocatalytic properties of K<sub>2</sub>Ti<sub>6</sub>O<sub>13</sub> thin films

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**Abstract:** The potassium hexatitanate thin films on ITO glasses substrates were prepared by sol-gel method, and was calcined at different temperatures. The structure and surface morphology of the K<sub>2</sub>Ti<sub>6</sub>O<sub>13</sub> film were examined by XRD and AFM, respectively. The photocatalytic activity of the K<sub>2</sub>Ti<sub>6</sub>O<sub>13</sub> film was evaluated by the degradation of partial coverage of octadecyltrichlorosilane (OTS) grafted on K<sub>2</sub>Ti<sub>6</sub>O<sub>13</sub> film, and the behaviour of photogenerated carrier was characterized by chronopotentiometry, cyclic voltammetry and chronoamperometry. The results show that the K<sub>2</sub>Ti<sub>6</sub>O<sub>13</sub> film calcined at 500 °C has the highest photocatalytic activity and the highest photocurrent, it is even superior to TiO<sub>2</sub>. The reason that K<sub>2</sub>Ti<sub>6</sub>O<sub>13</sub> film calcined at 500 °C has the higher performance may be appropriate crystallinity, lesser grain size and large specific surface area, and the quantum yield illuminated under 254 nm laser source is 6.9%

**Key words:** potassium hexatitanate film; photocatalysis; photoelectrochemical property

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