

陈野,吴荣华,段体岗,温青.Ti/SnO<sub>2</sub>-Sb<sub>2</sub>O<sub>5</sub>/PbO<sub>2</sub>电极的制备及降解不同污染物性能研究[J].环境科学学报,2014,34(3):606-611

### Ti/SnO<sub>2</sub>-Sb<sub>2</sub>O<sub>5</sub>/PbO<sub>2</sub>电极的制备及降解不同污染物性能研究

#### Preparation and performance of Ti/SnO<sub>2</sub>-Sb<sub>2</sub>O<sub>5</sub>/PbO<sub>2</sub> as electrode material for the degradation of different pollutants

关键词: [电催化氧化](#) [Ti/SnO<sub>2</sub>-Sb<sub>2</sub>O<sub>5</sub>/PbO<sub>2</sub>电极](#) [苯酚](#) [靛蓝胭脂红](#) [甲基橙](#)

基金项目: [国家自然科学基金 \(No.51179033\)](#); [哈尔滨市科技创新人才研究专项资金项目 \(No.2009RFXXG204\)](#); [高等学校博士学科点专项科研基金 \(博导类\) \(No.20132304110027\)](#)

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摘要: 采用溶胶凝胶法和电沉积法分别制备了Ti/SnO<sub>2</sub>-Sb<sub>2</sub>O<sub>5</sub>/PbO<sub>2</sub>电极的中间层和表面活性层,并通过XRD和SEM对电极的中间层和表面活性层进行了相关表征.结果表明,制得的电极表面为β型PbO<sub>2</sub>,表面形貌均匀致密.同时,采用线性伏安扫描和交流阻抗测试对电极的电化学性能进行了测试.结果表明,电解液中污染物的存在可提高电极的析氧电位,中间层的制备可以有效提高电极的催化性能.另外,通过测定电极对苯酚、靛蓝胭脂红、甲基橙3种不同类型污染物的去除率、COD去除率,研究了该电极对不同类型有机物的降解规律.结果表明,在相同条件下该电极对靛蓝胭脂红的去除速率较高且所需电压最低,降解1 h时靛蓝胭脂红去除率即达100%,甲基橙降解3 h时其COD去除率高达55%.

**Abstract:** The interlayer and surface active layer of Ti/SnO<sub>2</sub>-Sb<sub>2</sub>O<sub>5</sub>/PbO<sub>2</sub> electrode prepared by sol-gel and electrodeposition methods were characterized through X-ray diffraction (XRD) and scanning electron microscopy (SEM). Experimental results showed that the surface active layer of the prepared electrode might be β-PbO<sub>2</sub> and its surface was mainly comprised of uniform and dense pyramidal-shape PbO<sub>2</sub> crystals. Linear sweep voltammetry (LSV) and Electrochemical Impedance Spectroscopy (EIS) were applied to study electrochemical performance of the prepared electrode, indicating that the existence of the targets in the electrolyte can increase the oxygen evolution potential of the electrode and the preparation of the middle tier can effectively improve the catalytic performance of the electrode. Meanwhile, the degradation rules of electrode for three different kinds of organic compounds, including phenol, indigo carmine and methyl orange, were investigated during the degradation process. Experimental results revealed the supreme degradation efficiency against indigo carmine, and that the removal percentages could reach 100% when the time of degradation was up to 1 h, but the COD removal percentages achieved a maximum only 55% when methyl orange was degraded for 2 h. The lowest voltage in the forming of indigo carmine was found by recording the voltage variation of the degradation process.

**Key words:** [electrocatalytic oxidation](#) [Ti/SnO<sub>2</sub>-Sb<sub>2</sub>O<sub>5</sub>/PbO<sub>2</sub> electrode](#) [phenol](#) [indigo carmine](#) [methyl orange](#)

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