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研究报告

表面活性剂辅助制备钛阳极的电化学性能

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摘要: 用阳离子表面活性剂(CTAB)作为阳极氧化物涂层生长模板剂,用热分解法制备出30% RuO₂-70% TiO₂/Ti 涂层电极。用计时电位、循环伏安方法分析CTAB用量对涂层电催化性能的影响。结果表明:CTAB在降低析氯电位,提高电极电催化活性上具有显著的效果。表面活性剂CTAB所起的作用主要可以归结为两个方面,一方面用表面活性剂为模板剂使制备的阳极涂层具有高比表面积和多孔性结构,增大涂层的真实表面积;另一方面,CTAB辅助所制备的电极涂层具有高密度的缺陷结构,使涂层的催化活性位密度增大。

关键词: 钛阳极 表面活性剂 粗糙度 表面活性点 电化学性能

ELECTROCHEMICAL PROPERTIES OF TITANIUM ANODES PREPARED BY SURFACTANT-ASSISTED

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Abstract: 30%Ru-70%Ti/Ti anode coatings on titanium TA2 substrates were prepared by thermal decomposition method. The cationic surfactant cetyltrimethylammonium bromide (CTAB) was introduced into this process as a templating agent. The effect of the templating agent CTAB on the surface area and the electrocatalytic activity of the anodes were studied by chlorine evolution potential (ECI), cyclic voltammetry (CV), voltammetric charge capacity (q^*), active sites (N_a) and roughness (R_f) tests. The results show that the using of templating agent CTAB had significant effects on reducing chlorine potential and enhancing electrocatalytic activity. The improvements of the electrocatalytic activity the RuO₂-TiO₂/Ti anodes can be attributed to two reasons: on the one hand, the high-surface areas and the porous oxide structures were obtained via CTAB, on the other hand, the porous oxide coatings had high-density structural defects, the surface active sites density was increased.

Keywords: titanium anode, surfactant roughness, surface-active site electrochemical properties

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