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钛合金稀土阳极化成膜过程的电化学研究

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ELECTROCHEMICAL STUDY ON PROCESS OF RARE-EARTH OF TI-ALLOY ANODIZATION

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摘要

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摘要 对钛合金稀土阳极氧化的电化学过程进行了研究;重点研究了钛合金稀土阳极氧化的成膜过程;分析了不同硫酸浓度,不同成膜电压条件下,电化学参数的变化,讨论了稀土阳极氧化膜的成膜机理;通过对阳极氧化膜的 SEM微观形貌图及其他电化学参数的分析,推断氧化膜为分层结构;在一定温度和电压下,对电极电位的变化进行了研究,探讨了稀土阳极氧化膜的成膜过程和导电机制;提出了稀土阳极氧化膜是由具有一定半导体特性和电容性的致密层与多孔层构成的,整个成膜过程中导电是由空穴、铈盐离子和溶液离子共同完成的

关键词: 钛合金 稀土 阳极化 氧化膜 电化学

Abstract: The electrochemical study was presented on the process of a rare-earth Ti-alloy anodic oxidation. The formation of a rare-earth Ti-alloy anodization film was studied. At different concentrations of sulfuric acid and different applied voltages, the variation of electrochemical parameters was analyzed respectively. The process of rare-earth Ti-alloy anodization was discussed, based on the variation of the current density. With the analysis of SEM micrograph of the oxide film and other electrochemical parameters, the construction of the oxide film by layers was presented. The process of the formation and the conductive tissue of the rare-earth Ti-alloy anodization film were investigated by studying the variation of the potential at a certain temperature and applied voltage. A model of the formation of the rare-earth Ti-alloy anodization film was described. The film was composed of the porous layer and the compact layer with semiconductivity as well as capacity. The conduction current of rare-earth Ti-alloy anodization included hole conduction, ion Ce conduction and electrolyte ions conduction.

Keywords: titanium alloy rare earth anodization oxide film electrochemistry

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