

论文摘要

中国有色金属学报

ZHONGGUO YOUSEJINSHUXUEBAO XUEBAO

第18卷 第10期 (总第115期) 2008年10月

 [PDF全文下载]

文章编号: 1004-0609(2008)10-1839-07

铝合金表面无铬化学转化膜的制备及其性能

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摘要:采用正交实验优化铝合金稀土转化处理液的配方, 采用点滴腐蚀法、极化曲线、交流阻抗研究铝合金表面稀土转化膜的耐腐蚀性能, 利用硬度计、SEM、EDS研究转化膜的表面硬度、形貌与组成。结果表明: 处理液中添加成膜促进剂可提高转化膜的生长速度, 并且添加铵盐、氯化物后转化膜的铈含量从5.93% 改变为4.15%和9.27%; 还发现添加成膜促进剂铵盐、氯化物后转化膜耐腐蚀性提高为原来的2.6和5.6倍, 其中后者的耐点滴腐蚀能力优于传统铬酸盐转化膜, 并且还可将铝合金表面的显微硬度从HV68.8增大至HV389和HV450。

关键字: 铝合金; 转化膜; 无铬; 稀土

Preparation of chrome-free chemical conversion coating on aluminum alloy and its performance

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Abstract:An orthogonal experiment was conducted to optimize the solution formula to form a chrome-free chemical conversion coating on aluminium surface. The anti-corrosion of the coating was evaluated with dropping test, potentiodynamic polarization curve and EIS. The surface hardness was determined with micro-hardness tester, and the micro-morphology, element composition of the coating were analysed with SEM and EDS, respectively. The results show that the addition of accelerators to the treating bath will accelerate the coating formation, and the added ammonium salt and chloride will change the Ce content in the coating from 5.93% to 4.15% and 9.27%, respectively. The added accelerators of ammonium salt and chloride could also increase the coating anti-corrosion performance to 2.6 times and 6.6 times against that treated without accelerator, respectively, and increases the micro-hardness of the Al surface from HV68.8 to HV389

and HV450, respectively.

Key words: aluminum alloy; conversion coatings; chrome-free; rare earth

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