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论文

环境对高强度铝合金应力腐蚀行为的影响

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摘要：

本文研究了高强度铝合金在大气环境下的应力腐蚀性能，并与实验室加速试验结果进行对比。2A12和 7A04 铝合金的C型环应力腐蚀试样分别取自直径为30mm和40mm的棒材的短横向，直拉伸应力腐蚀试样取相同规格与热处理条件的棒材的长向，施加的应力分别为60%σ0.2、70%σ0.2、80%σ0.2和90%σ0.2。所有带力试样暴露在北京大气试验站、青岛团岛大气试验站、海南万宁试验站，同时在实验室进行了3%NaCl溶液中周期浸润腐蚀试验和3%NaCl+0.5%H2O2溶液中的拉伸应力腐蚀试验。试验结果表明高强度铝合金在不同的环境中产生应力腐蚀的敏感性不同，在海洋性环境下2A12铝合金的应力腐蚀的敏感性比7A04高，在暴露期间未开裂的2A12铝合金C环试样则产生严重的剥落腐蚀，未开裂的7A04铝合金C环试样则产生严重的点腐蚀。3%NaCl溶液中周期浸润腐蚀试验和3%NaCl+0.5%H2O2溶液中的拉伸应力腐蚀试验作为高强铝合金SCC敏感性判定方法,模拟海洋大气腐蚀过程，与户外的试验结果具有较好的相关性。

关键词： 海洋环境 大气腐蚀 加速试验 应力腐蚀

The Influence of Different Enviroments on Stress Corrosion Cracking

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Abstract:

An investigation of the stress corrosion cracking resistance of high strength aluminum alloys 2A12 and 7A04 in different atmospheric environment were presented, results were compared with those obtained in laboratory accelerated tests. C-ring and direct tension stress corrosion specimens were taken from the short transverse grain and the longitudinal direction of aluminum alloy stick respectively, applied stress level were 60, 70, 80 and 90 percent of the σ0.2. The atmospheric stress corrosion tests were exposed to three different atmospheric test stations in China, one in Beijing, typical semi-rural atmosphere, others in coastal city, Qingdao (East of China) and Wanning (South of China). In the meantime, alternate immersion and direct tension stress corrosion immersion in salt solution were conducted in laboratory condition. The results showed that SCC performance of aluminum alloys could be evaluated within one year in marine atmospheric environment, otherwise, only exfoliation corrosion or pitting was observed. The alternate corrosion results showed that SCC of aluminum alloy was consistent with outdoor exposed samples in the marine atmospheric environment.

Keywords: Marine enviroments atmospheric corrosion accelerated tests SCC

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