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论文

热速处理对Mg-7Al-0.4Zn-0.2Mn合金耐腐蚀性能的影响

关绍康; 陈晶阳; 胡俊华; 任晨星; 杨卿

郑州大学材料科学与工程学院

摘要：

测定自腐蚀电位、盐雾腐蚀速率和观察试样盐雾腐蚀表面形貌，研究了热速处理对Mg-7Al-0.4Zn-0.2Mn合金耐腐蚀性能的影响.结果表明：合金的腐蚀行为受到显微组织和铁含量的共同影响.过热温度(Ts)为810 ℃时，热速处理对合金耐腐蚀性能的改善作用并不大；过热温度为850 ℃时，热速处理显著细化了合金晶粒，β相的尺寸和间距变小，β相对α 相腐蚀的阻碍作用增加，而且合金中的铁含量并没有提高，从而改善了合金在试验条件下的耐腐蚀性能；过热温度为890 ℃时，组织中存在热裂纹和显微疏松缺陷，合金含铁量显著增高，合金的耐腐蚀性能下降.相同的过热温度下，合金的耐腐蚀性能随着激冷速度(Vc)的增大而逐步改善.综合考虑合金的显微组织和耐腐蚀性能，优化的热速处理工艺为：Ts=850 ℃，Vc=2.0 ℃/s.此时，合金的耐腐蚀性能达到试验的最佳值，自腐蚀电位比未热速处理合金提高约15 mV，盐雾腐蚀速率比未热速处理合金降低21.9%.

关键词： Mg-7Al-0.4Zn-0.2Mn合金 热速处理 显微组织

INFLUENCE OF THERMAL-RATE TREATMENT ON THE CORROSION RESISTANCE OF Mg-7Al-0.4Zn-0.2Mn ALLOY

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郑州大学材料科学与工程学院

Abstract:

The influence of thermal-rate treatment on the corrosion resistance of Mg-7Al-0.4Zn-0.2Mn(AZ70)alloy was studied by observing corrosion morphology,measuring corrosion potential and salt-spray corrosion rate.The results show that the corrosion behavior of AZ70 alloy depends on both its microstructure and iron content.When Ts is 850 ℃,grains are fined and the size of βphase and the distance betweenβphase pasticles are small.The corrosion barrier effect ofβ phase onαphase is enhanced and the iron content does not increase much at this temperature.So the corrosion resistance is improved.The corrosion resistance of AZ70 alloy falls off when Ts is 890 ℃,which attributes to the presence of microporosity,hot cracking and increase of iron content.At the same superheat-temperature,the corrosion resistance is improved with the increase of chilling rate.In comprehensive consideration of microstructure and corrosion resistance of AZ70 alloy,the optimal TRT process is that Ts=850 ℃ and Vc=2.0 ℃/s.In that case,the corrosion potential is 15 mV higher and the salt-spray corrosion rate is 21.9% lower than that of un-TRT treated alloy.

Keywords: Mg-7Al-0.4Zn-0.2Mn(AZ70) alloy Thermal-rate treatment(TRT) Microstructure Grain refinement Corrosion

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通讯作者: 关绍康

作者简介: