中国有色金属学报
中国有色金属学报(英文版)
中国科学技术协会 主管
中国有色金属学会 主办

论文摘要

中国有色金属学报
ZHONGGUO YOUSEJINSHUXUEBAO XUEBAO
第18卷 第12期 (总第117期) 2008年12月

[PDF全文下载] [全文在线阅读]

文章编号：1004-0609(2008)12-2145-06

微量Sc对AA7085铝合金组织与性能的影响

肖代红，巢 宏，陈康华，黄伯云

(中南大学 粉末冶金国家重点实验室，长沙 410083)

摘 要：通过铸锭冶金工艺，制备含微量Sc的AA7085铝合金。采用金相观察、力学性能测试、扫描电镜及透射电镜分析，研究添加0.3%Sc对基体合金的铸态及锻造态的显微组织和力学性能的影响。结果表明，添加0.3%Sc能细化铸态合金的晶粒，抑制锻造态合金的再结晶，最终提高基体合金的强度和断裂韧性；含0.3%Sc的合金抗拉强度达到562 MPa，断裂韧性K_{IC}(S-L)达到34 MPa·$m^{1/2}$。含Sc的AA7085合金的强化机制主要是Al_3(Sc, Zr)相引起的细晶强化、亚结构强化和沉淀强化。

关键字：AA7085铝合金；Sc；再结晶；显微组织；力学性能

Effect of minor Sc addition on microstructure and properties of AA7085 alloy

XIAO Dai-hong, CHAO Hong, CHEN Kang-hua, HUANG Bai-yun

（State Key Laboratory of Powder Metallurgy, Central South University, Changsha 410083, China）

Abstract: AA7085 alloys with minor Sc content were prepared by ingot metallurgy method. The effect of Sc addition on the microstructure and mechanical properties of the based alloys was investigated using optical microscope, mechanical properties testing, scanning electron microscopy (SEM) and transmission electron microscopy (TEM). The results show that 0.3%Sc addition refines the grains of the casting alloys, and inhibits the recrystallization of the forged alloy. AA7085 alloy with 0.3%Sc content has higher strength and fracture toughness, and σ_b and K_{IC}(S-L) are 562 MPa and 34 MPa·$m^{1/2}$, respectively. The strengthening mechanisms of AA7085 alloy with Sc element are mainly the sub-structure strengthening, precipitation strengthening and refiner grain strengthening of Al_3(Sc, Zr) phase.

Key words: AA7085 alloy; scandium; recystallization; microstructure; mechanical property

地 址：湖南省长沙市岳麓山中南大学内　　邮编： 410083

电 话： 0731-8876765，8877197, 8830410　　传真： 0731-8877197

电子邮箱： f-ysxb@mail.csu.edu.cn