

论文摘要

中国有色金属学报

ZHONGGUO YOUSEJINSHUXUEBAO XUEBAO

第19卷 第10期 (总第127期) 2009年10月

 [PDF全文下载]  [全文在线阅读]

文章编号: 1004-0609(2009)10-1748-06

界面错配应力对铝合金粗化机制影响的微观相场模拟

马 锐, 王永欣, 陈 铮, 苗海川, 钟汉文, 苗树芳

(西北工业大学 凝固技术国家重点实验室, 西安 710072)

摘 要: 采用微观相场法研究铝基合金中界面错配应力对沉淀相粗化过程的影响。结果表明: 界面错配应力为零时, 粗化机制符合经典LSW机制; 错配应力较大时, 粗化机制是位向控制粗化机制, 沉淀相颗粒沿弹性“软”方向规则分布; 中等界面错配应力时, 粗化机制为兼具位向控制和LSW机制的混合机制; 界面错配应力促进沉淀相延弹性软方向生长; 沉淀相的粗化过程和长大过程交叠进行。

关键字: 铝合金; 粗化机制; 粗化速率; 界面错配应力

Microscopic phase-field simulation of influence of interfacial mismatch stress on coarsening mechanism of aluminum alloy

MA Rui, WANG Yong-xin, CHEN Zheng, MIAO Hai-chuan, ZHONG Han-wen, MIAO Shu-fang

(State Key Laboratory of Solidification Processing, Northwestern Polytechnical University, Xi'an 710072, China)

Abstract: Influence of interface mismatch stress on precipitate coarsening process in aluminum alloys was investigated using a microscopic phase-field model. The results show that, when the interface mismatch stress is zero, the coarsening mechanism complies with the classic LSW theory. When the mismatch stress is large, the coarsening mechanism is orientation-controlled. The precipitate particles are distributed periodically along the elastic soft directions. At medium interface mismatch stress, the coarsening mechanism is mixed with both orientation-control and LSW mechanism. The interface mismatch stress promotes precipitate growing in elastic soft directions. The coarsening process and growth process of the precipitates overlap with each other in proceeding.

Key words: aluminum alloy; coarsening mechanism; coarsening rate; interfacial mismatch stress

地 址：湖南省长沙市岳麓山中南大学内 邮编： 410083

电 话： 0731-88876765, 88877197, 88830410 传真： 0731-88877197

电子邮箱： f-ysxb@mail.csu.edu.cn