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复合添加Nd与B对AZ91镁合金组织和力学性能的影响

赵德刚, 田长文, 刘运腾, 姜利坤, 詹成伟

山东省科学院新材料研究所, 山东 济南 250014

摘要:

研究了复合添加Nd和B对AZ91镁合金的微观组织和力学性能的影响。结果表明, 复合添加B和Nd明显细化了α-Mg和β-Mg<sub>17</sub>Al<sub>12</sub>相。晶粒细化主要源自于AlB<sub>2</sub>相作为α-Mg的异质形核衬底, 添加的Nd细化了β-Mg<sub>17</sub>Al<sub>12</sub>相。扫描电镜分析表明, Al<sub>2</sub>Nd和Mg<sub>12</sub>Nd主要分布在晶界上, 并且对合金力学性能起到了重要的促进作用。由于晶粒细化及热稳定相Al<sub>2</sub>Nd和Mg<sub>12</sub>Nd的存在, AZ91镁合金的常温力学性能得到大大改善。

关键词: 镁合金 硼 钕 微观组织 力学性能

Effects of Nd and B combined addition on microstructure and mechanical properties of AZ91 magnesium alloy

ZHAO De-Gang, TIAN Chang-Wen, LIU Yun-Teng, JIANG Li-Kun, ZHAN Cheng-Wei

Institute of New Materials, Shandong Academy of Sciences, Jinan 250014, China

Abstract:

This paper presents the effects of B and Nd combined addition on microstructure and mechanical properties of AZ91 alloy. SEM results show that B and Nd combined addition significantly refines the grain size of α-Mg and β-Mg<sub>17</sub>Al<sub>12</sub> precipitates. Grain refinement is due to the presence of AlB<sub>2</sub> particles, nucleants for Mg grains, and Nd addition refines β-Mg<sub>17</sub>Al<sub>12</sub> phases. Al<sub>2</sub>Nd and Mg<sub>12</sub>Nd exist on the intermetallic surface. They have high thermal stability and significantly improve mechanical properties of magnesium alloys. Normal temperature mechanical properties of AZ91 alloys are greatly improved due to grain refinement and the presence of Al<sub>2</sub>Nd and Mg<sub>12</sub>Nd.

Keywords: magnesium alloy Boron Neodymium microstructure mechanical property

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通讯作者: 赵德刚(1981-), 男, 博士, 研究方向为轻质高强合金。

作者简介:

作者Email: degang2008@163.com

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