

强磁场下相变研究进展

李传军, 任忠鸣

(上海大学 上海市现代冶金与材料制备重点实验室, 上海 200072)

Progress in the Research of Phase Transformations in High Magnetic Field

LI Chuan-jun, REN Zhong-ming

(Shanghai Key Laboratory of Modern Metallurgy & Materials Processing, Shanghai University, Shanghai 200072, China)

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摘要

磁场作为一种调控材料组织结构的新方法已经引起了人们广泛的关注.相变过程能够决定材料的结构和性能,大量的研究表明,磁场能够改变相变热力学和动力学条件,从而改善或改变材料的微观组织、形貌、成分分布以及性能特征.评论了磁场下相变研究状况,介绍了磁场下测量材料相变的一些常用方法,重点描述了磁场对铁磁性合金结构相变和扩散型相变热力学和动力学的影响,讨论了磁场在热处理过程、晶界工程等方面的一些研究状况,分析了磁场对非磁性物质相变过程、组织形貌的影响.

关键词: [磁场](#); [相变](#); [热力学](#); [动力学](#)

Abstract:

Processing of materials in a high magnetic field has received much attention over the past decades. Phase transformations have a decisive effect on structures and properties of materials. Many studies have indicated that a magnetic field can change thermodynamics and kinetics of phase transformations and further modify microstructures, morphologies, compositions and performance. The article reviews development of phase transformations in a high magnetic field. Methods used to detect phase transformations are briefly described. The effect of a magnetic field on thermodynamics and kinetics of phase transformations in ferrous magnetic alloys is described. In addition, the thermal treatment and grain boundary engineering in a magnetic field are discussed. Studies on phase transformations and structural morphologies of non-magnetic materials in a magnetic field are surveyed.

Keywords: [magnetic field](#); [phase transformation](#); [thermodynamics](#); [kinetics](#)

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通讯作者 任忠鸣(1958~), 男, 教授, 博士生导师, 研究方向为材料电磁加工. Email: zmren@staff.shu.edu.cn

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