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应用物理,电子学

电流退火CuBe/绝缘层/NiCoP复合结构丝的磁化特性和巨磁阻抗效应

程金科[1,2]，潘海林[1]，何家康[1]，袁望治[1]

1. 华东师范大学 物理系，上海200062； 2. 贵州大学 化学工程学院，贵阳550003

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摘要 用化学镀的方法制备了CuBe/绝缘层/NiCoP复合结构丝，用2 A直流电流退火2 min. 研究了退火对样品巨磁阻抗效应的影响，发现退火大幅度提高了样品的巨磁阻抗效应，最大磁阻抗比率ΔZ/Z由制备态时的42.3%提高到693.1%，增加了15.4倍. 利用复数磁导率和等效电路研究了样品的磁化特性, 并对电流退火增强复合结构丝巨磁阻抗效应的机理作了分析. 电流退火消除内应力且改变样品的磁结构，使得退火样品的Δμ′ 和Δμ″ 远大于制备态样品，增强了样品的巨磁阻抗效应.

关键词 磁化特性；巨磁阻抗；NiCoP；化学镀；绝缘层

分类号 0482.54； TM271+.2

Magnetization property and magneto-impedance of dc Jouleannealed CuBe/insulator/NiCoP composite wire(Chinese)

CHENG Jin-ke[1,2],PAN Hai-lin[1],HE Jia-kang[1],YUAN Wang-zhi[1]

1. Department of Physics, East China Normal University, Shanghai200062, China;
2. College of Chemical Engineering, Guizhou University, Guiyang550003, China

Abstract

CuBe/insulator/NiCoP composite wire was produced by electroless-deposition and annealed using Joule annealing method with a dc current of 2 A for 2 min, in which the influence of current annealing on giant magneto-impedance (GMI) effect was investigated. The results showed that the GMI effect in the composite wire can be greatly enhanced by dc Joule annealing. The GMI ratio increases from 42.3% of as-deposited sample to 693.1%, about 15.4 times. The property of magnetization and the enhancement mechanism of GMI effect were analyzed in terms of complex permeability and equivalent circuit. Because the dc Joule annealing can release the internal stress and change the magnetic structure of specimen,Δμ′ and Δμ″of annealed composite wire is much greater than that of as-deposited, resulting in the enhancement of GMI effect.

Key words magnetization magnetoimpedance NiCoP electroless-deposition insulator

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通讯作者 袁望治 wzyuan@phy.ecnu.edu.cn.