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论文

NiAl多晶—纳米晶的磁性转变

侯碧辉;易俗;秦晓英;沈保根;纪小丽;张立德

中国科学技术大学;合肥,230026,中国科学院物理研究所,磁学国家重点实验室,北京100080;中国科学技术大学;合肥,230026;中国科学院固体物理研究所;合肥,230031;中国科学院物理研究所;磁学国家重点实验室,北京,100080;中国科学技术大学;合肥,230026;中国科学院固体物理研究所;合肥,230031

摘要： 本文对多晶NiAl以及不同粒径的NiAl样品的磁性进行了研究．结果表明：大块多晶NiAl合金的磁化率X很小．大约为3×10－5／g，其比磁化强度σ几乎不随温度变化，在1．5－150K温度范围，平均粒径为8．6nm的制备态纳米NiAl的σ随温度的增高而显著下降，由σ-T曲线可得到其居里温度Tc为124K．制备态的纳米NiAl经退火处理后得到的平均粒径分别为12，18和21nm的三种样品的σ比普通多晶NiAl高两个量级，而且在1．5—300K温度范围，σ随温度变化很小．表明多晶NiAl合金在其晶粒纳米化后发生了非磁性－磁性转变。

关键词： 纳米NiAl 非磁性－磁性转变 金属磁性

MAGNETISM TRANSITION IN NiAl POLYCRYSTAL-NANOCRYSTAL

HOU Bihui;YI Su; QIN Xiaoying;SHEN Baogen; JI Xiaoli; ZHANG Lide(University of Science and Technology of China, Hefei, 230026)(State Key Laboratory of Magnetism, Institiste of Physics, Chinese Academy of Sciences, Beijing, 100080)(Institute of Solid State Physics, Chinese Academy of Sciences, Hefei 230031)(Manuscript received 1996-04-09, in revised form 1996-07-01)

Abstract: The magnetism of bulk polycrystal NiAl and nanostructural NiAl with various grain diameter was studied. The susceptibility of a bulk polycrystal NiAl X is about 3.0×10-3 / g, its specific magnetization σ has almost not change with temperature. The σof as condensed nanostructural NiAl samples with average grain size of 8.6 nm, diminishes obviously with the increase in temperature at a range of 1.5 -150 K, from tis σ-T curve we get the Curie temperature TC of the sample being about 124 K. Other three samples obtained by annealed the condensed NiAl samples at various temperatures have average grain sizes of 12,18 and 21 nm, their a are two orders of magnitude larger than that of the bulk polycrystal NiAl, change slightly with temperature at range of 1.5-300 K. The experimental results indicate that there exists nonmagnetism-magnetism transition between polycrystal NiAl alloy and nanostructural NiAl.

Keywords: nanostructural NiAl nonmagnetism-magnetism transition metal magnetism

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通讯作者:

作者简介:

作者Email:

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