

Accepted Manuscript

Research articles

Effect of short-range order on magnetic and transport properties of Fe₂MnGa Heusler alloy films

Y.V. Kudryavtsev, A.K. Melnyk, V.V. Trachevskyi, I. Gościańska, J. Dubowik

PII: S0304-8853(17)30813-2

DOI: <http://dx.doi.org/10.1016/j.jmmm.2017.05.050>

Reference: MAGMA 62754

To appear in: *Journal of Magnetism and Magnetic Materials*

Received Date: 7 March 2017

Accepted Date: 16 May 2017

Please cite this article as: Y.V. Kudryavtsev, A.K. Melnyk, V.V. Trachevskyi, I. Gościańska, J. Dubowik, Effect of short-range order on magnetic and transport properties of Fe₂MnGa Heusler alloy films, *Journal of Magnetism and Magnetic Materials* (2017), doi: <http://dx.doi.org/10.1016/j.jmmm.2017.05.050>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Effect of short-range order on magnetic and transport properties of Fe₂MnGa Heusler alloy films

Y. V. Kudryavtsev^a, A. K. Melnyk^b, V. V. Trachevskiy^c, I. Gościańska^d, J. Dubowik^e

^a*Institute of Metal Physics, NAS of Ukraine, Vernadsky 36, 03142 Kiev, Ukraine*

^b*Institute for Sorption and Problems of Endoecology NAS of Ukraine, Naumov 13, 03164 Kiev, Ukraine*

^c*Technical Centre, NAS of Ukraine, Pokrovska 13, 04070 Kiev, Ukraine*

^d*Faculty of Physics, A. Mickewicz University, 61-614, Poznań, Poland*

^e*Institute of Molecular Physics, PAS, Smoluchowskiego 17, 60-179 Poznań, Poland*

Abstract

Fe₅₆Mn₂₀Ga₂₄, Fe₄₆Mn₃₅Ga₁₉ and Fe₃₉Mn₂₅Ga₃₆ Heusler alloy (HA) films are investigated. It is shown that as-deposited Fe-Mn-Ga films are fine crystalline with a body-centered cubic (BCC) structure. Annealing of the films leads to the formation of a face-centered cubic (FCC) structure. The BCC to FCC transformation results in a drastic increase in the magnetization, the Curie temperature as well as in a change of the sign of temperature coefficient of resistivity from negative to positive. These effects are discussed in terms of band structures of L₂₁ and L₁₂ phases of stoichiometric Fe₂MnGa HA.

Keywords:

Heusler alloy films, short range order, magnetic properties, transport properties, phase transition

PACS 73.91.-r, 75.70.Ak, 76.50.+g, 81.30.Hd

1. Introduction

Fe₂MnGa Heusler alloy (HA) represents an interesting alternative [1, 2, 3, 4, 5, 6, 7, 8, 9] to the archetype of ferromagnetic shape memory alloy Ni₂MnGa exhibiting a characteristic metastability with respect of martensitic transformation [10, 11].

In comparison to Ni₂MnGa, the situation in Fe₂MnGa (or Fe-Mn-Ga in general) is even more complicated since, besides the martensitic instability [1, 3], BCC and FCC types of structure are almost equally thermodynamically probable [1, 12]. Experimentally determined ternary phase diagrams for bulk Fe-Mn-Ga alloys have shown that either BCC or FCC structure or a mixed phase of BCC and FCC

Email address: kudr@imp.kiev.ua (Y. V. Kudryavtsev)

Download English Version:

<https://daneshyari.com/en/article/5490445>

Download Persian Version:

<https://daneshyari.com/article/5490445>

[Daneshyari.com](https://daneshyari.com)