Structural and magnetic properties of $Y_{1-x}Gd_xCo_2$ (x = 0 - 1) alloys

Z. Śniadecki,[1,2] A. Musiał,[1,3] A. Łojewski,[4] M. Jarek,[3] R. Puźniak,[5] A. Wiśniewski,[5] and B. Idzikowski[1]

[1]*Institute of Molecular Physics, PAS, Poznań, Poland*
[2]*INT, KIT, Eggenstein-Leopoldshafen, Germany*
[3]*NanoBioMedical Centre, Adam Mickiewicz University, Poznań, Poland*
[4]*Poznań University of Technology, Poznań, Poland*
[5]*Institute of Physics, PAS, Warsaw, Poland*

YCo_2 has cubic $MgCu_2$–type crystalline structure typical for intermetallic Laves phase. The ratio of two rare-earth elements in $Y_{1-x}Gd_xCo_2$ alloys can change their magnetic properties from Pauli paramagnetic for YCo_2 to the ferrimagnetic $GdCo_2$ [1]. The fully crystal ribbons was produced by melt-spinning under argon atmosphere. X-ray measurements show that substitution of gadolinium in alloys, determined lattice constant a for crystal phase increase from 7.219 to 7.26 Å for YCo_2 and $GdCo_2$ respectively, which can be result of larger ionic radius for gadolinium atoms. Ac-susceptibility data for $Y_{0.5}Gd_{0.5}Co_2$ show magnetic ordering below $T_C = 251$ K.

References:

[1] E. Gratz, A.S. Markosyan, J. Phys.: Condens. Matter 13 (2001) R385

Work was supported by the NCRD within the project no. POKL.04.03.00-00-015/12.