G., Schnelle, W., Kuz'ma, Yu., Grin, Yu. *Z. Anorg. Allg. Chem.,* 2004, 630, 635.

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Mossbauer and neutron diffraction study of polycrystalline $GaFeO_3$.

M.Bakr[a], K.Szymański[c], A. Senyshyn[a], G.Parzych[b], L.Dobrzynski [b,c], H. Fuess[a].
[a]*Institut for Materials Science, Darmstadt University of Technology, D - 64289 Darmstadt, Germany .* [b] *The Soltan Institute for Nuclear Studies, Poland,* [c] *Faculty of Physics,University of Bialystok, Poland.*
E-mail: mbm1977@yahoo.com.

Gallium iron oxide ($GaFeO_3$) is a member of a multiferroic family which exhibits ferrimagnetic and piezoelectric properties below room temperature [1-2].This material has orthorhombic crystal structure with space group P c 2_1 n with four different cation sites labeled Ga1, Ga2 (mostly occupied by gallium) and Fe1, Fe2 (mostly occupied by iron) [3-5]. Polycrystalline $GaFeO_3$ materials have been prepared by a traditional solid state reaction (SR) and sol-gel (SG) methods. The Curie temperature (T_C) for $GaFeO_3$ (SR) is about 190K and increases or reaches room temperature when the temperature of preparation is decreased from 1400°C to 900°C. The dielectric constant and dielectric loss are temperature and frequency independent for both samples.
Mossbauer analysis shows that at least two different assignment of the EFG and IS for the main Fe1 and Fe2 sites are possible. Both assignments results in similar site occupancies. It follows from the neutron powder diffraction that $GaFeO_3$ exhibits a ferrimagnetic order with spins parallel to c-axis. Also Mossbauer indicates for higher temperature of magnetic order in SG sample, in agreement with magnetization and neutron data.

[1] JP. Reimeka , J. Appl.Phys. 31 263S, 1960. [2] E.A. Wood, Acta Cryst. 13, 682, 1960. [3] S.C.Abrahams, J.M.Reddy and I.L.Bernstein, Chem.Phy.42, 3957-3968, 1965. [4] G.T. Rado, Phys. Rev. Lett. 13 ,335-337,1964. [5] T.Arima, D.Higashiyama, Y.Kaneko, J.P.He, T.Goto, S.Miyasaka, T.Kimura, K.Oikawa, T.Kamiyama, R.Kuumai, and Y.Tokura, Phys.Rev.B 70, 064426,1-8, 2004.

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Spin strucure in ultrathin fcc-Fe films on Cu(001).

H. L. Meyerheim[a], J.-M. Tonnerre[b], M. Przybylski[a], F.Yildiz[a], X. L. Fu[a], E. Bontempi[c], A. Ramos[b], S. Grenier[b], J. Kirschner[a]. [a]*MPI f. Mikrostrukturphysik, Weinberg 2, D-06120 Halle, Germany.* [b]*Institut Néel, CNRS, F-38043 Grenoble, France.* [c] *Lab. di Chimica, Univ. di Brescia, 25123 Brescia, IItaly.*
E-mail: hmeyerhm@mpi-halle.mpg.de

Using soft x-ray resonant magnetic reflectivity in combination with frst-principles calculations we present a new model of the magnetic structure in fcc-Fe grown on Cu(001). Magneto Optic Kerr Effect (MOKE) experiments indicate an inverse spin reorientation transition, where the easy magnetization axis changes from in-plane at 4 monolayers (ML) to out of plane at 8ML thickness, while at 6 ML a hysteresis loop is found for both, in and out of plane magnetization [1].
Three samples were prepared consisting of 4, 6 and 8 ML on Cu(001) capped by 3nm Au. For each atomic layer both, the magnitude and the direction of the magnetization is fitted. While at 4ML the sample is ferromagnetic, for the anti-ferromagnetic structures in the coverage range between 6 and 8 ML we find blocks with robust magnetic structure, while the relative directions between the blocks vary involving a non-collinearity within the spin structure [2]. Experimental results are supported by parameter-free calculations within the framework of the density functional theory.

[1] Jenniches,H.; Shen, J.; Mohan, C.V.; Manoharan, S.S.; Barthel, J.; Ohresser, P.; Klaua, M.; Kirschner, J. Phys. Rev. 1999, B 59, 1196 .
[2] Meyerheim, H.L.; Tonnerre, J.-M.; Sandratskii, L.; Tolentino, H.C.N.; Przybylski, M.; Gabi, Y.; Yildiz, F.; Fu, X.L.; Bontempi, E.; Grenier, S.; Kirschner, J. Phys. Rev. Lett. 2009, 103, 267202.

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