Poster Presentations

[MS20-P04] Preparation, structural and magnetic properties of $SrFe_{12}O_{19}$ and $Sr_3Co_2Fe_{24}O_{41}$ multiferroics.

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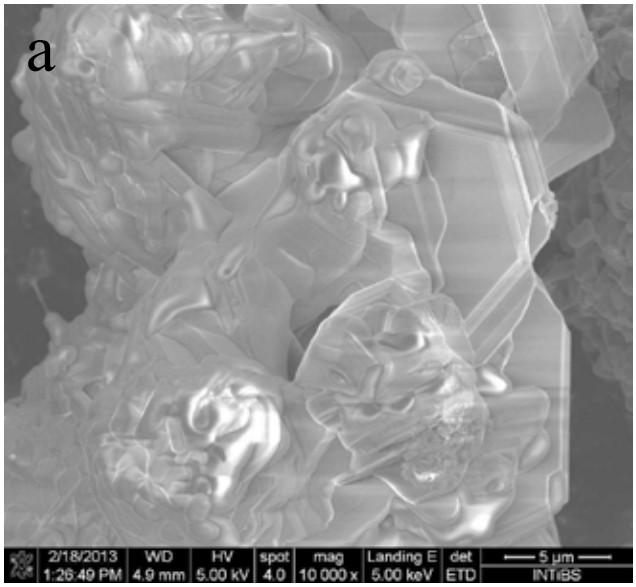
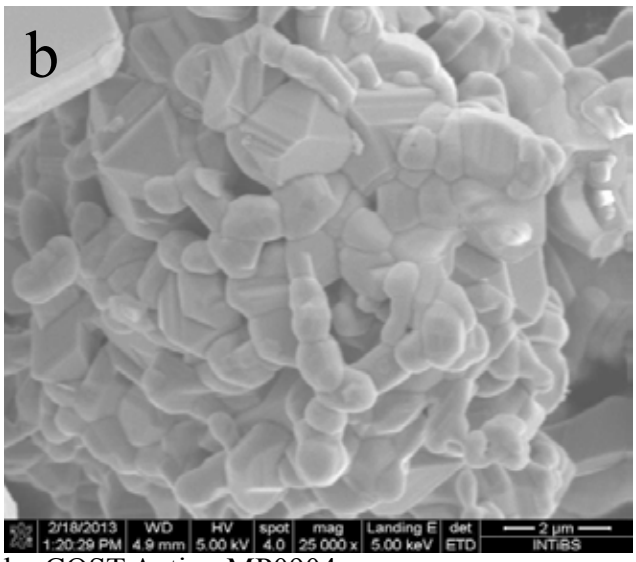
Although hexagonal ferrites have been well-known for several decades recently their magnetic properties have been intensively investigated. There is a special interest in the magnetoelectric (ME) effect induced by the weak magnetic field that has been found in $Sr_3Co_2Fe_{24}O_{41}$crystals [1]. There are six basic types of hexaferrite materials: M-, Y- ,Z-,W-, X-, and U-type, respectively. Among them, the ME effect has been shown for the Y-, Z-, U- and M-types [2,3]. Multiferroics with ME are promising for a variety of applications including data storage, magnetic field sensors, and microwave devices. The intrinsic magnetic properties of hexaferrites are strongly dependent on their crystal structure. Crystal structures of hexaferrites can be described as plates of cubic close packed oxygens with smaller metal ions in octahedral and tetrahedral interstices.

In this work we report the preparation, structural and magnetic properties of M-type hexaferrite - $SrFe_{12}O_{19}$ and Z-type hexaferrite - $Sr_3Co_2Fe_{24}O_{41}$. Both materials were synthesized by a self-catalyzed reaction. X-ray powder diffraction was performed using Cu Kα radiation using X'Pert PRO powder diffractometer (PANalytical). The micrographs of the $SrFe_{12}O_{19}$ and $Sr_3Co_2Fe_{24}O_{41}$ microgranular systems were investigated by the field emission scanning electron microscopy (FE-SEM) and transmission electron microscopy (TEM). The magnetic properties were studied using a commercial physical properties measurements system (PPMS, Quantum Design).





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[1] Jiangtao Wu et al. (2012) Appl. Phys. Lett. 101, 122903
[2] Ailin Xia et al. (2013), J. Magnetism and Magnetic Materials, 332 186-191,
[3] Robert C. Pullar, (2012), Progress in Materials Science, 57 1191-1334

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