

**ELECTRON BACKSCATTER DIFFRACTION
ANALYSIS APPLIED TO (001) MAGNETITE THIN FILMS GROWN
ON MgO SUBSTRATES.**

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Electron backscatter diffraction (EBSD) analysis is applied to (001) oriented magnetite thin films grown on MgO substrates [1]. By means of EBSD, the crystallographic orientation of individual grains can be determined with a high spatial resolution up to 50 nm on such ceramic samples [2]. A high image quality of the Kikuchi patterns was achieved enabling multi-phase scans. The obtained data are presented in form of phase and orientation maps, pole figures and orientation distribution functions. From the orientation maps, we can deduce the local misorientations created during the thin-film growth. Furthermore, a multi-phase analysis is possible enabling to study the influence of MgO on the growth of the magnetite thin-films. Several types of magnetite thin-films were analysed; one as-grown and the others after different annealing steps in oxygen atmosphere. The presence of small islands of MgO is only seen for the as-grown sample. From the EBSD mappings, we learn that the optimum orientation in (001)-direction is not yet achieved for the as-grown sample, but develops upon oxygen treatment. Furthermore, the distribution of misorientation angles within the investigated area (= 1 grain) is found to change during the annealing steps. After 3 minutes annealing, most of the misorientations around 30°-40° are vanished, and some islands with high misorientation angles remain, which may play a role as antiferromagnetic pinning centres. This work is supported by the DFG (MU959/12) and the EU-funded project "ASPRINT".

[1] Y. Zhou, X. Jin, and I. V. Shvets J. Appl. Phys. 95 (2004) 7357

[2] M. R. Koblischka and A. Koblischka-Veneva Physica C 392-396 (2003) 545