MLZ Conference: Neutrons for information and quantum technologies



Contribution ID: 23

Type: Poster

Fabrication and characterization of $\mbox{SrCoO}_{3-\delta}$ thin films

Thursday 6 June 2019 17:35 (1 minute)

Because of its multivalent Co states and high oxygen mobility $\text{SrCoO}_{3-\delta}$ (SCO) is a promising material for energy and spintronic applications [1]. Upon changing its oxygen content it exhibits a topotactic phase transition. While SrCoO_3 is a ferromagnetic metal (T_C =305 K) with perovskite structure,

 $\rm SrCoO_{2.5}$ is an antiferromagnetic insulator (T $_N$ =570 K) with brown millerite structure.

In this contribution, we focus on the fabrication of $SrCoO_{2.5}$ thin films by molecular beam epitaxy on various substrates like $SrTiO_3$ and $LaAlO_3$. As Sr and Co are coevaporated from distinct effusion cells, the first task is to obtain stoichiometric thin films. We present results of RHEED assisted stoichiometric thin film growth and of driving the topotactic transition by annealing in low oxygen gas flow.

For bulk SCO it has been shown that the perovskite structure can be stabilized by adding of about 5 % rare earth ions [2]. For this reason we study the effect of Sm doping on the crystal structure of SCO thin films. The magnetic properties were studied with SQUID and the crystalline properties by surface characterization methods like LEED, RHEED and XRR.

[1] H. Jeen et al., Nature Materials 12, (2013) 1057

[2] M. James et al., Solid State Sciences 6 (2004) 655

Authors: SCHÖFFMANN, Patrick (Jülich Centre for Neutron Science (JCNS) at Heinz Maier-Leibnitz Zentrum (MLZ), Forschungszentrum Jülich GmbH); PÜTTER, Sabine (Jülich Centre for Neutron Science JCNS, Outstation at MLZ, Forschungszentrum Jülich GmbH); Dr SCHUBERT, Jürgen (Forschungszentrum Jülich GmbH, Peter Grünberg Institut and JARA-FIT); PALMEN, Katja (Forschungszentrum Jülich GmbH, Jülich Centre for Neutron Science, Peter Grünberg Institut and JARA-FIT); BRÜCKEL, Thomas (Forschungszentrum Jülich GmbH)

Presenter: PÜTTER, Sabine (Jülich Centre for Neutron Science JCNS, Outstation at MLZ, Forschungszentrum Jülich GmbH)

Session Classification: Poster Session