Contribution ID: **21** Type: **Short talk**

Reversible tuning of structural, magnetic and transport properties via oxygen desorption/absorption in epitaxial La0.7Sr0.3MnO3-δ thin films

Tuesday, 25 June 2019 16:15 (1 hour)

An oxygen vacancy induced topotactic transition from perovskite to brownmillerite and vice versa in epitaxial La0.7Sr0.3MnO3-δ thin films is identified by real-time x-ray diffraction. A novel intermediate phase with a non-centered crystal structure is observed for the first time during the topotactic phase conversion which indicates a distinctive transition route. Polarized neutron reflectometry confirms an oxygen deficient interfacial layer with drastically reduced nuclear scattering length density, further enabling a quantitative determination of the oxygen stoichiometry (La0.7Sr0.3MnO2.65) for the intermediate state. Associated physical properties of distinct topotactic phases (i.e. ferromagnetic metal and anti-ferromagnetic insulator) can be switched reversibly by an oxygen desorption/absorption cycling process.

L. Cao, O. Petracic, P. Zakalek, A. Weber, U. Rücker, J. Schubert, A. Koutsioubas, S.Mattauch, and Th. Brückel, Reversible Control of Physical Properties via an Oxygen-Vacancy-Driven Topotactic Transition in Epitaxial La0.7Sr0.3MnO3–δ Thin Films,
Adv. Mater. 2018, 1806183 (2018)

Primary authors: CAO, Lei (Jülich Centre for Neutron Science (JCNS-2) and Peter Grünberg Institut (PGI-4), JARA-FIT Forschungszentrum Jülich GmbH, Jülich, Germany); PETRACIC, Oleg (Jülich Centre for Neutron Science (JCNS-2) and Peter Grünberg Institut (PGI-4), JARA-FIT Forschungszentrum Jülich GmbH, Jülich, Germany); ZAKALEK, Paul (Jülich Centre for Neutron Science (JCNS-2) and Peter Grünberg Institut (PGI-4), JARA-FIT Forschungszentrum Jülich GmbH, Jülich, Germany); WEBER, Alexander (Jülich Centre for Neutron Science (JCNS) at Heinz Maier-Leibnitz Zentrum (MLZ) Forschungszentrum Jülich GmbH, Garching, Germany); RÜCKER, Ulrich (Jülich Centre for Neutron Science (JCNS-2) and Peter Grünberg Institut (PGI-4), JARA-FIT Forschungszentrum Jülich GmbH, Jülich, Germany); SCHUBERT, Jürgen (Peter Grünberg Institute (PGI9-IT), JARA-Fundamentals of Future Information Technology Forschungszentrum Jülich GmbH, Jülich, Germany); KOUTSIOUBAS, Alexandros (Jülich Centre for Neutron Science (JCNS) at Heinz Maier-Leibnitz Zentrum (MLZ) Forschungszentrum Jülich GmbH, Garching, Germany); MATTAUCH, Stefan (Jülich Centre for Neutron Science (JCNS) at Heinz Maier-Leibnitz Zentrum (MLZ) Forschungszentrum Jülich GmbH, Garching, Germany); BRÜCKEL, Thomas (Jülich Centre for Neutron Science (JCNS-2) and Peter Grünberg Institut (PGI-4), JARA-FIT Forschungszentrum Jülich GmbH, Jülich, Germany)

Presenter: PETRACIC, Oleg (Jülich Centre for Neutron Science (JCNS-2) and Peter Grünberg Institut (PGI-4), JARA-FIT Forschungszentrum Jülich GmbH, Jülich, Germany)

Session Classification: Poster session