



Contribution ID: 21

Type: Poster

Diffraction Experiments under Extreme Conditions on Single Crystals with Hot Neutrons on HEiDi

Wednesday, 11 December 2019 15:40 (20 minutes)

Single crystal diffraction (scd) with neutrons is one of the most versatile tools for detailed structure analysis on various hot topics related to physics, chemistry and mineralogy. The scd HEiDi at the Heinz Maier-Leibnitz Zentrum (MLZ) offers high flux, high resolution and large q range, low absorption and high sensitivity for light elements.

At very high temperatures studies on $\text{Nd}_2\text{NiO}_{4+\delta}$ and $\text{Pr}_2\text{NiO}_{4+\delta}$ brownmillerites concerning their oxygen diffusion pathways reveal anharmonic displacements of the apical oxygens pointing towards the interstitial vacancy sites which create a quasicontinuous shallow energy diffusion pathway between apical and interstitial oxygen sites [M. Ceretti et al., J. Mater. Chem. A 3, 21140-21148, 2015]. Recent studies use a special mirror furnace developed at MLZ which allows not only temperatures > 1300 K but also atmospheres with various oxygen contents and different pressures around the sample to study their influence to the evolution of the occupation of the interstitial sites.

Last but not least a BMBF (German ministry for education and research) funded project was launched in 2016 in order to allow studies on tiny samples $< 1 \text{ mm}^3$ and to develop new pressure cells for HEiDi which can be combined with its existing low temperature equipment in order to study structural properties down to temperatures below 10 K, e.g. MgFe_4Si_3 compounds and their magnetic features [A. Grzechnik et al., J. Appl. Cryst. 51, 351-356, 2018].

Primary author: Dr MEVEN, Martin (RWTH Aachen & JCNS @ MLZ)

Co-authors: Dr DUTTA, Rajesh (Institut für Kristallographie, RWTH Aachen University); GRZECHNIK, Andrzej (RWTH Aachen); FRIESE, Karen (Jülich Centre for Neutron Science, Research Centre Jülich); ROTH, Georg (RWTH-Aachen)

Presenter: Dr MEVEN, Martin (RWTH Aachen & JCNS @ MLZ)

Session Classification: Poster session

Track Classification: Structure Research