MS15-P16 | OXIDES UNDER EXTREME CONDITIONS: PUSHING THE LIMITS OF NEUTRON DIFFRACTION

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The $LaCo_xMn_{1-x}O_3$ perovskite series has been widley studied as responses to chemical composition or volume give rise to a variety of electrical and magnetic properties [1]. Volume changes can be induced by the application of pressure, which can be used to study structural-property relationships. High-pressure neutron-diffraction experiments have been performed on $LaCo_{0.9}Mn_{0.1}O_3$ and $LaCoO_3$ powders. Neutron powder diffraction is essential to determine the structure of perovskite-like oxides. The high-pressure structural evolution of $LaCo_{0.9}Mn_{0.1}O_3$ will be presented [2]. The change in tilting angle and strain has been determined upon pressure. This study compliments high-pressure magnetisation measurements, where the Curie temperature shows a strong dependence on applied pressure. A structural study of $LaCoO_3$ as a function of pressure and temperature using neutron diffraction will also be presented [3]. This study is of great interest for its unique temperature-dependent electronic properties. Tha aformentioned experiments have been carried out on the PEARL instrument, the high-pressure-dedicated diffractometer at ISIS, STFC [4]. We are developing new pressure cells for neutron diffraction to extend the maximum achievable pressure at ISIS.

[1] C. Autret *et al*, 2005, J. Phys, Condens. Matter 17, 1601;
[2] C. Capone *et al*, 2018, J. Phys. Condens. Matter 30, 035402;
[3] M. Capone *et al*, 2019, Physica Status Solidi A, 1800736;
[4] C. Bull *et al*, 2016, High Press. Res. 36, 493.