In order to study the phase and structural behaviour in the La(Pr)AlO₃–TbAlO₃ pseudo-binary systems series of La(Pr)₁₋ₓTbxAlO₃ samples with x in the range of 0.1 – 0.9 were prepared from the oxides La₂O₃, Pr₆O₁₁, Tb₂O₇ and Al₂O₃ by a combination of solid state reaction and arc melting in Ar atmosphere. The crystal structures and of the solid solutions La(Pr)₁₋ₓTbxAlO₃ and their thermal behaviour in a wide temperature range of 12–1173 K have been investigated by using high-resolution powder diffraction applying synchrotron radiation (beamline B2, HASYLAB at DESY) and DTA/DSC methods. All crystallographic calculations (refinements of the lattice parameters as well as full profile structure refinements) were performed by means of the Windows version of the Crystal Structure Determination program package WinCSD.

From the results of the XRD phase and crystal structural analysis it was established that two kinds of solid solutions with rhombohedral and orthorhombic structures exist at ambient temperature. A wide immiscibility gap exists between these two perovskite-type phases. All lattice parameters decrease with increasing temperature, mounting the MDAC to the cold finger of a cryostat). Data collection for structure determination (refinement) is possible thanks to the use of 2D detectors (Rayonix SX-165 or XPAD pixel detector[3]) and the implementation of the rotation method for data collection.

Several examples will be presented to illustrate the possibility of the beamline for HPC studies. They demonstrate that although CRISTAL is not specialized in high-pressure studies, HPC can be routinely and successfully performed in conditions analogous to those found at dedicated beamlines in other synchrotron facilities.

Keywords: perovskites, crystal structures, phase transitions
X-ray speciation studies of materials and processes related to the nuclear fuel cycle. Plenary lecture. LH. Advanced characterization of palladium catalysts by in situ, operando and time-resolved X-ray absorption and scattering. Materials science and energy-related materials. 16. In situ observation of the adsorption species on carbon-supported Platinum catalyst in polymer electrolyte fuel cells probed by HERFD-XANES. Materials science and energy-related materials. 101. 14:00 In situ simultaneous Raman high resolution X-ray powder diffraction study of transformations occurring in materials at non ambient conditions (25 min) Marco Milanesio, Università del Piemonte Orientale "Amedeo Avogadro". 14:25 Structure and Dynamics of water in confined pores - dehydration effects in natural zeolites (25 min) Dewi Lewis, University College London, Chemistry. Working conditions based on complementary operando Raman-GC and in situ xanes spectroscopies (45 min) Miguel A. Bañares, Institute for Catalysis, CSIC; Catalytic Spectroscopy Laboratory. Experimental opportunities, examples and equipment available for combined in-situ studies at SNBL. Wouter van Beek. Magda holds the Chair in Sustainable Energy Materials at Imperial. Magda’s research focuses on carbon and carbon hybrids produced via hydrothermal processes, waste recycling into advanced products, renewable energy technologies, clean energy storage, flexible supercapacitors, carbon-based O2 electrocatalysis, CO2 capture and conversion, and exploring the optoelectronic properties of nanocarbons. He is currently a PDRA in Sarah Haigh’s group at the University of Manchester, working with graphene-windowed cells for in situ STEM/ TEM imaging of thin liquid samples. Scientific Organising Committee. Dr Robert Weatherup, Diamond-Manchester Research Fellow and Lecturer in Physical Chemistry.