**Poster Presentation**

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## *Synthesis and characterisation of (La,Pr) monazite solid solution series*

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Monazite type ceramics are considered as potential ceramic storage materials for high level nuclear waste. Natural monazite is a host for radioactive elements like U and Th without becoming metamict due to radiation damage. Monazites are also known for their chemical flexibility and thermal stability. In this context, a solid solution series of (La,Pr)PO4 was synthesised as powders and single crystals and characterised by PXRD (Powder X-Ray Diffraction analysis), EMPA (Electron Microprobe Analysis), TGA (Thermal Gravimetric Analysis) and DSC (Differential Scanning Calorimetry). La and Pr were used as inactive surrogates for the minor actinides Am, Cm and Np, which represent major challenges in nuclear waste management due to their long half-life and high radiotoxicity. The powder samples were prepared following the protocol of [1]. Ln2O3 were mixed with NH4H2PO4 in excess. Powders were ground, pressed, and heated for one day at 1250 °C in air. X-Ray laboratory and synchrotron data showed that all samples were single phase. A decrease in the lattice parameters and volume with increasing Pr content was observed as expected due to the smaller radius of Pr3+ with respect to La3+ in nine fold coordination. The monoclinic angle β showed a linear increase. Using EMPA, the composition of all samples was determined. The average deviation from the nominal composition was calculated to be about 4 mol% which covers both, sample inhomogeneity and, more importantly, experimental challenges due to grain shape and porosity. In TGA and DSC curves, similar behaviour for all samples was observed, except for the Pr end member. This unsolved issue is currently under investigation. Complementary IR and Raman spectroscopic data showed the expected linear trends [2]. This behaviour was also reported for LnPO4 (Ln = La-Gd) [3]. The author gratefully thanks the BMBF (02 NUK 021E) for financial funding.

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