

Beamtime Report for Final No. 01-02-1172

15 shifts at BM-01/SNBL for our home build *in situ* cell for hydrothermal syntheses were successfully finished.

The formation of hexagonal YMnO_3 under hydrothermal conditions was followed using *in situ* X-ray diffraction at temperatures ranging from 240 °C to 350 °C. The effects of different precursors, mineralizer concentrations, reducing conditions using Mn_3O_4 , yttrium:manganese precursor ratios and citric acid stabilizer were studied. These experiments resulted in hexagonal YMnO_3 in the majority phase (~90%) with varying amounts of secondary phases, dependent on reaction conditions; YMn_2O_5 , orthorhombic perovskite YMnO_3 . The reaction mechanism was studied revealing the formation of hydroxide intermediate phase (Figure 1).

The formation of $\text{Sr}_x\text{Ba}_{1-x}\text{Nb}_2\text{O}_6$ (SBN) under hydrothermal conditions was followed by *in situ* X-ray diffraction, studying the effects of niobium off-stoichiometry, strontium:barium ratios (0.2:0.8 – 0.6:0.4), and temperature. Temperature studies were performed to study the kinetics of the formation of the SBN.

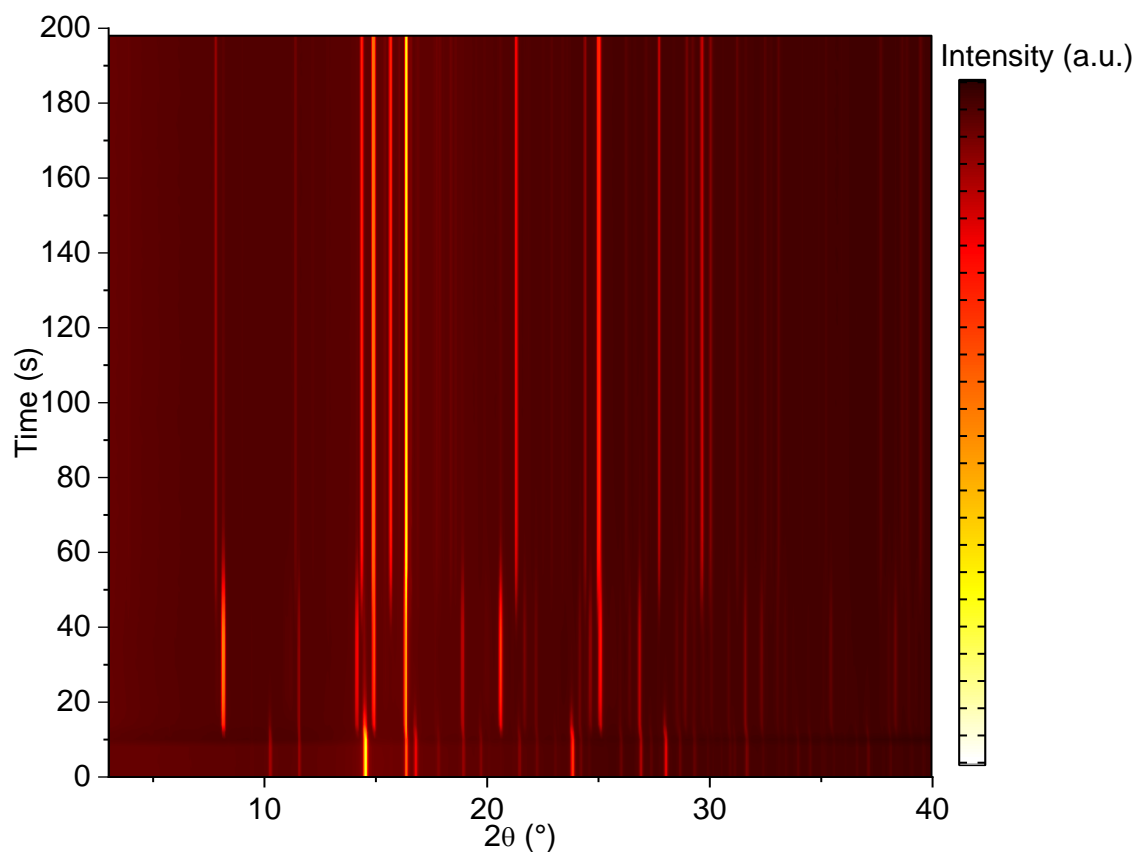


Figure 1: Contour plot showing the formation of YMnO_3 . First $\text{Y}(\text{OH})_3$ appears as Y_2O_3 disappears, then the YMnO_3 appears together with small amounts of secondary phases.