

Phase Transition Sequence in Ferroelectric Aurivillius Compounds

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The high-temperature paraelectric-ferroelectric transformation in Aurivillius materials is not yet well characterized. They are known to be non-polar tetragonal at high temperature and ferroelectric at room temperature, but an intermediate phase has been reported in some cases and explained using ab-initio calculations [1]. This intermediate phase is related with the existence of an additional non-polar anti-ferrodistortive instability. Its independent freezing in this intermediate phase seems a necessary condition for a subsequent continuous or quasi-continuous phase transition into the ferroelectric phase [1]. We present a single-crystal X-ray diffraction investigation of the transition sequence in some representative members of the family as $\text{SrBi}_2\text{Ta}_2\text{O}_9$ (SBT) and $\text{SrBi}_2\text{Nb}_2\text{O}_9$ (SBN). By monitoring specific reflections as a function of temperature, sensitive either to the superstructure formation or to polar displacements, it was possible to check the existence or not of an intermediate phase. This latter was confirmed in SBT, but within experimental accuracy could not be detected in SBN, confirming previous reports [2]. The reason for this different behaviour is unclear and requires further theoretical investigations.

[1] Perez-Mato J.M., et al., *Phys. Rev. B*, 2004, **70**, 21411. [2] Snedden A., et al., *Phys. Rev. B*, 2003, **67**, 092102.

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