

MS14-P26 | RARE-EARTH Pnictide Chalcogenides REBiTe and RESbS (RE = La-Nd): STRUCTURE DETERMINATION BY COMBINATION OF TRANSMISSION ELECTRON MICROSCOPY AND MICROFOCUSSED SYNCHROTRON RADIATION

Lindemann, Tobias (Universität Leipzig, Leipzig, GER); Wright, Dr. Jonathan P. (European Synchrotron Radiation Facility, Grenoble, FRA); Benndorf, Dr. Christopher (Universität Leipzig, Leipzig, GER)

Searching for compounds such as LaSbTe [1], which form charge density waves (CDW), investigations of rare-earth (RE) pnictide chalcogenides yielded a new series of compounds REBiTe with layered crystal structures. These can be described as an alternating stacking of 2D extended [Bi]⁻ and [RETe]⁺ sheets with predominantly ionic interaction between them. In the microcrystalline products, suitable crystallites for data collection using microfocused synchrotron radiation (beamline ID11, ESRF) were selected using TEM imaging, EDX and electron diffraction [2]. The compounds crystallize with a monoclinic distortion variant of the PbFCl-type structure characterised by small distortions within the square-like arrangement of Bi atoms. Investigation of electrical transport properties showed differences, most remarkable for CeBiTe, which is a semiconductor between 5 and 300 K, in contrast to NdBiTe, which exhibits a metal to semiconductor transition at 150 K. Further investigations of pnictide chalcogenides lead to the discovery of isotypic compounds RESbS. Synthesis was carried out by cold-pressing mixtures of the elements with the ideal atomic ratio to pellets and heating them to 1223 K in evacuated silica tubes for 5-7 d. The phase-pure samples appeared as dark greyish polycrystalline substances with slight metallic lustre.

[1] E. DiMasi, B. J. Foran, M. C. Aronson, S. Lee, *Phys. Rev. B* **1996**, *54*, 13587-13596.

[2] F. Fahrnbauer, T. Rosenthal, T. Schmutzler, G. Wagner, G. B. M. Vaughan, J. P. Wright, O. Oeckler, *Angew. Chem.* **2015**, *127*, 10158-10161.