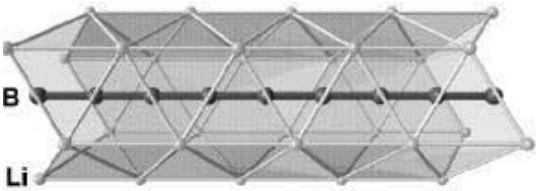
s1.m1.p11 **LiB_x – An Incommensurate Composite Structure at Low Temperatures**. M. Wörle*, R. Nesper*, T. Chatterji+, *Laboratory of Inorganic Chemistry, ETH Zürich, Universitätstr. 6, CH-8092 Zürich; +Institut Laue Langevin, BP156, F-38042 Grenoble Cedex 9.*
Keywords: aperiodic, incommensurate.

The lithium boride LiB_x ($0.82<x<1.0$) the first boride known to contain linear boron chains, isoelectronic to carbyne which are embedded and stabilized in a lithium matrix[1]. Indeed, this compound contains a surprising solution to the famous carbyne problem. At room temperature the boron chains are disordered, giving rise to diffuse scattering in the corresponding X-ray and neutron powder diffraction patterns. At about 150 K a second order phase transition takes place which leads finally to the formation of an incommensurate composite structure. The crystal structures at 2 K of both sublattices were determined from the neutron diffraction experiment and refined in the space group P–1($\alpha\beta\gamma$).



[1] Wörle M., Nesper R. "Infinite Linear Unbranched Borynide Chains in LiB_x – Isoelectronic to Polyyne and Polycumulene", Angewandte Chemie, in press

s1.m1.p12 **New incommensurate misfit layer oxides in the system (Bi, Ca, Co, O).** S. Lambert, H. Leligny, D. Grebille, *Lab. CRISMAT (UMR CNRS 6508), ISMRA, 14050 CAEN Cedex*.
Keywords: misfit, incommensurate, oxide.

Recently, a new family of oxide composite structures has been discovered in the [Bi-(Sr,Ca)-Co-O] and [Tl-(Sr,Ca)-Co-O] systems and characterized by E.M. and EXAFS observations[1,2]. It shows strong analogies with the well known family of misfit layered chalcogenides $(MX)_{1+x}(TX_2)_m$[3] with the alternate stacking along c of pseudohexagonal layers and rock-salt type layers, sharing the same a parameter but exhibiting two incommensurate periodicities along b.

A first structural study of the $[Bi_{0.87}SrO_2]_2[CoO_2]_{1.82}$ phase in the 5D superspace formalism was carried out using single crystal X-ray diffraction data.[4]

A more systematic investigation of these families has been carried out. Single crystals and powder samples of the prototype phase $Ca_3Co_4O_9$ and of a Bi substituted phase ($Bi_{0.11}Ca_3Co_{3.7}O_9$) have been synthetized. A characterization of the symmetry of these phases will be presented using Weissenberg or precession photographs and synchrotron X-ray diffraction patterns. The symmetry of the Bi free phase is monoclinic (a= 4.85Å, b=4.55Å, c=10.74Å, β=98°) and the sample presents a twinning phenomenon. Some extra reflections are observed in the common (a*,c*) plane and can be explained assuming an intrinsic modulation within the RS sublattice. The Bi substituted phase, in spite of a weak substitution rate and of very close values of the cell parameters, shows a different orthorhombic symmetry. A fisrt description of this structure is proposed.

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[2] Boullay Ph. Chem. Mater. Chemical and physical aspects of the misfit layer oxides $Tl_x[(Sr_{1-y}Ca_y)O]_{1+x}(CoO_2)$ (1998) 10 : 92-102
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