Oral presentation

Charge density waves in compounds $RAl_{4-x}Ga_x$ (R = Eu, Sr, Ca, Ba; 0 < x < 4)

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The $BaAl_4$ structure type has tetragonal symmetry *I4/mmm* with three crystallographically independent atom sites. Several solid solution series $RAl_{4-x}Ga_x$ (R = Eu, Sr, Ca, Ba; $0 < x < 4$) crystallize in this structure type [1], where Ga preferably occupies one of the two independent Al sites. Accordingly, complete chemical order is found for x = 0, 2, 4. Incommensurate charge-density waves (CDWs) have been observed in several of these ordered compounds. The periodic lattice distortion (PLD) accompanying the CDW—and in particular its symmetry—is currently under debate [2-6]. Orthorhombic symmetry appears to be certain for the CDW/PLD [2]. However, both *Immm* and *Fmmm* based symmetries have been proposed [2,6]. Alternatively, non-centrosymmetric symmetries are possible [3-5]. There are indications that different compounds $RAl_{4-x}Ga_x$ might develop CDWs of different symmetries. The symmetry of the CDW state is of fundamental importance for understanding magnetic order that appears at lower temperatures. Here, we discuss the nature of the CDWs in $RAl_{4-x}Ga_x$ on the basis of structure refinements in superspace against accurate single-crystal x-ray diffraction data.

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