Poster

Charge density wave structural phase transition in $SrAl_2Ga_2$

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Intermetallic compounds with the $BaAl_4$ structure type have attracted a lot of attention for their properties as topological quantum materials. The compounds $R(Al_{1-x}Ga_x)_4$ (where R= Eu, Sr) have a tetragonal crystal structure with space group *I4/mmm* at room temperature [1]. The temperature dependence of electrical resistivity of these compounds suggests the formation of a charge density wave (CDW) in $EuAl_4$ at T_{CDW} = 145 K [2], in $SrAl_4$ at T_{CDW} = 243 K [3] and in $EuGa_2Al_2$ at T_{CDW} = 51 K [1]. Crystal structure of incommensurately modulated CDW phase can be described by the superspace group theory [4]. The presence of 2nd order satellite reflections in the single-crystal X-ray diffraction (SXRD) of $SrAl_4$ points towards a loss of inversion symmetry in the CDW state of $SrAl_4$. The CDW has modulation vector q = (0, 0, 0.1116) at 200 K and the non-centrosymmetric superspace group *F222(00g)00s* [5].

The present study reports the structural phase transition in $SrAl_2Ga_2$. We have performed the SXRD at beamline P24 of PETRA-III at DESY (Hamburg, Germany) in the temperature range of 298 K – 25 K. $SrAl_2Ga_2$ possesses the tetragonal symmetry with space group I4/mmm at room temperature. First-order satellite reflections were observed below 42 K. These satellites are used to study the charge density wave transition in the material.

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