

Distortions of $[\text{Sb}_2\text{Cl}_{10}]^{4-}$ Bioctahedra and Phase Transitions in the Chloroantimonate(III) $(\text{C}_3\text{H}_5\text{NH}_3)_2[\text{SbCl}_5] \cdot (\text{C}_3\text{H}_5\text{NH}_3)\text{Cl}$

Bartosz Zarychta, Maciej Bujak, and Jacek Zaleski

Institute of Chemistry, University of Opole, Oleska 48, 45-052 Opole, Poland

Reprint requests to Prof. J. Zaleski. Fax: (+48)-77-4410741. E-mail: zaleski@uni.opole.pl

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Bis(allylammonium)pentachloroantimonate(III) – allylammonium chloride, $(\text{C}_3\text{H}_5\text{NH}_3)_2[\text{SbCl}_5] \cdot (\text{C}_3\text{H}_5\text{NH}_3)\text{Cl}$, belongs to the chloroantimonate(III) organic-inorganic salts family. The DSC studies of this compound showed two anomalies at 181 K and at 223 K. Both are associated with phase transitions, which mainly occur due to ordering-disordering processes of the organic cations. Between 181 and 223 K the structure is incommensurate. The crystal structure was determined at 298 and 86 K. At both temperatures the crystal structure consists of $(\text{C}_3\text{H}_5\text{NH}_3)^+$ cations, anionic distorted $[\text{Sb}_2\text{Cl}_{10}]^{4-}$ units and isolated Cl^- ions. In the room-temperature phase two out of three, and in the low-temperature phase two out of six allylammonium cations were found to be disordered. The deformations of the $[\text{Sb}_2\text{Cl}_{10}]^{4-}$ moieties in both phases are discussed and explained by the deviation of the Sb^{III} 5s electron lone pair from its spherical symmetry and the influence of N–H...Cl hydrogen bonds, which join together the organic and inorganic sublattices.

Key words: Chloroantimonates(III), Phase Transitions, Crystal Structure, Octahedral Distortions, Hydrogen Bonding