Uniwersytet Wrocławski

Repozytorium

Plik pochodzi z repozytorium Wydziału Chemii Uniwersytetu Wrocławskiego

On structural phase transitions in the $(C_5H_{12}N)_2SbCl_5$ crystals.

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2000

Czasopismo

Journal of Molecular Structure

Numer woluminu

553

Strony

175-186

DOI

10.1016/S0022-2860(00)00577-9

Kolekcja

Naukowa

Język

Angielski

Typ publikacji

Artykuł

Streszczenie

The results of the X-ray (at 295 and 355 K), dilatometric, differential scanning calorimetry and dielectric studies on a new piperidinium crystal, $(C_5H_{12}N)_2SbCl_5$, are presented. The anionic sublattice of the crystal is built up of infinite $(SbCl_5^{2-})_n$ chains composed of $SbCl_6^{3-}$ distorted octahedra connected with each other by corners. In voids of anionic sublattice two crystallographically independent piperidinium cations are located. At 295 K they are both in chair conformation. The compound undergoes three first-order phase transitions at 378.5 K (I→II), 339.5 K (II→III) and 205 K (III→IV). The mechanism of the (II→III) transition ($Pna2_1 \rightarrow P2_12_12_1$) was proposed based on the X-ray data. It is associated with changes in the conformation of the N(1) cation. In phase (III) its conformation changes to twist boat. The physical properties of this crystal are compared to those found for the other piperidinium crystals of the $(C_5H_{12}N)_2MX_5$ (M=Sb, Bi; X=Cl, Br) type.

Słowa kluczowe

Phase transition, Alkylammonium cations, X-ray diffraction, Differential scanning calorimetry, Dilatometric studies, Dielectric measurements

Adres publiczny

https://doi.org/10.1016/S0022-2860(00)00577-9

Strona internetowa wydawcy

http://www.elsevier.com

Plik został wygenerowany dnia 2026-11-07 21:16:06

Adres w repozytorium https://old.chem.uni.wroc.pl/pl/repozytorium/PA37_gO.