

Anomalous dielectric behaviour in centrosymmetric organic-inorganic hybrid chlorobismuthate(III) containing functional *N,N*-dimethylethylammonium ligand : crystal structure and properties.

Autorzy

Anna Piecha

Anna Gaġor

Magdalena Węclawik

Ryszard Jakubas

Wojciech Medycki

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The structure of $[\text{C}_2\text{H}_5\text{NH}(\text{CH}_3)]_3[\text{BiCl}_6]$ (abbreviated as DCB) was determined by a single-crystal X-ray diffraction at 115 K. The compound adopts tetragonal symmetry with the space group $I4_1/acd$; $a = 23.35 \text{ \AA}$, $c = 17.60 \text{ \AA}$, $V = 9598 \text{ \AA}^3$ and $Z = 16$. The crystal structure of DCB is built up of isolated $[\text{BiCl}_6]^{3-}$ units and *N,N*-dimethylethylammonium counterions that are accommodated in the large voids. At ambient temperature two-thirds of the counterions appear to be dynamically disordered. Dynamics of this type of cations contributes to the enhanced dielectric permittivity of DCB. A low frequency dielectric relaxation process that takes place between 200 and 300 K is characterized by an exceptionally large dielectric increment, $\Delta\epsilon > 100$, which is unprecedented in nonferroelectric materials. The molecular motions of the *N,N*-dimethylethylammonium cations were studied by means of NMR spin-lattice relaxation time measurements.

Słowa kluczowe

Halobismuthates(III), X-ray, Dielectric relaxation, proton magnetic resonance, *N,N*-dimethylethylammonium

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