Structural, thermal and dielectric studies on the novel solution grown (4-dimethylaminopyridinium) chloroantimonate(III) and chlorobismuthate(III) crystals.

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Streszczenie

The single crystals of the following 4-dimethylaminopyridinium chloroantimonates(III) and chlorobismuthates(III) have been grown by the solvent evaporation method: $(C_7H_{11}N_2)SbCl_4$, $(C_7H_{11}N_2)BiCl_4$ and . The one-dimensional (1D) structures for $(C_7H_{11}N_2)SbCl_4$ or $(C_7H_{11}N_2)BiCl_4$ and the zero-dimensional (0D) one for have been solved by the single-crystal X-ray diffraction method. $(C_7H_{11}N_2)SbCl_4$ and $(C_7H_{11}N_2)BiCl_4$ appeared to be isomorphous and crystallize in the monoclinic space group, *C*2/*c*, whereas in the orthorhombic one,*Imma*. The molecular arrangements in the subsequent crystal lattices have been studied. For all three compounds by using the differential scanning calorimetry (DSC) and thermogravimetric analysis (TGA) no structural phase transition has been detected in temperature region between 100 and 400 K. Nevertheless, the dielectric relaxation processes in temperature region 100–450 K and frequency range between 100 Hz and 2 MHz have been found in all crystals studied. The experimental results of the real and imaginary parts of the dielectric permittivity allow us to estimate the parameters of the relaxation processes, i.e. macroscopic relaxation times, τ, and activation energies, E_A. The dynamics of the dipolar organic cations is expected to contribute to the relaxations process in the crystals under investigation.

Słowa kluczowe

4-Dimethylaminopyridinium cations, Chloroantimonates(III) and chlorobismuthates(III), Single crystal X-ray, Dielectric relaxation

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