Molecular motion in solid$[(CH_3)_2CHNH_3]_2BiBr_5$ and $[(CH_3)_2CHNH_3]_2SbBr_5$ as studied by proton nuclear magnetic resonance.

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Streszczenie

Proton magnetic resonance spin-lattice relaxation time and second moment measurements were carried out on polycrystalline isopropylammonium bromobismuthate $[(CH_3)_2CHNH_3]_2$ $BiBr_5$ (IPBB) and bromoantimonate $[(CH_3)_2CHNH_3]_2SbBr_5$ (IPBA) salts over a wide temperature range. The proton spin–lattice relaxation measurements in both compounds reveal an asymmetric wide minimum due to the motions of the ammonium and methyl groups. Analysis of the relaxation data yields the activation energy barriers for the motion of the NH_3 and CH_3 groups. NMR data confirm the phase transitions, at 155 and 133 K for IPBB, and at 171 and 180 K for IPBA, known from previous studies. The phase transitions at 155 K in IPBB and at 180 K in IPBA are connected with freezing of the reorientation of isopropyl cations. The second moment measurements show that the structure is not rigid on the NMR scale at the lowest temperature studied, 10 K, and that CH_3 and NH_3 groups execute rotations about the C_3 axis.

Adres publiczny

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