SPECTROSCOPIC INVESTIGATIONS OF PECULARITIES OF STRUCTURE AND LATTICE DYNAMICS $NH_4IO_3 2HIO_3$

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The $NH_4IO_3 2HIO_3$ belongs to a hydrogen-bonded ion-covalent crystals and is characterized by a low symmetry. The space group of the crystal is $P1$ (z = 2). At the room temperature the crystal unit cell contains four inversion centers which lays in geometrical centers of bifurcated hydrogen bonds. The investigations of temperature dependence of the dielectric properties shown that crystal may undergo a second order phase transition at 213 = T_c. But the ferroelectrics properties of the title crystal were not founded at temperatures below T_c where the crystal retained its symmetry $P1$ or C_1^i. The analysis of temperature dependencies of the ^{127}I NQR spectra has shown that at 77 K the befurcations of hydrogen bonds fails, and the observed number of NQR lines is twice more than that predicted in accordance with crystal symmetry at 300 K. The analysis of IR spectra of the title crystal in wide temperature range of 100−300 K shows that for all frequency intervals which include the regions of covalent stretching vibrations I−O (500−900 cm^{-1}) and N−H (1000−1500 cm^{-1}) and also including the region of covalent stretching vibrations O−H of hydroxyls of hydrogen bonds. These experimental facts lead us to conclusion that the phase transition has the attributes of antiferrelectric phase transition with doubling of unit cell volume at $T < T_c$. This phase transition do not changes the crystal symmetry ($P1$).