

Structure and ferroelectric properties of $[\text{C}_3\text{N}_2\text{H}_5]_5[\text{Bi}_2\text{Br}_{11}]$.

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A ferroelectric crystal $[\text{C}_3\text{N}_2\text{H}_5]_5[\text{Bi}_2\text{Br}_{11}]$ has been synthesized and structurally characterized at 170 and 100 K. The crystal structure consists of discrete corner-sharing bioctahedra $[\text{Bi}_2\text{Br}_{11}]^{5-}$ and highly disordered imidazolium cations. The room temperature crystal structure has been determined as monoclinic, space group, $P 2_1/n$ with: $a = 9.257(2) \text{ \AA}$, $b = 15.157(3) \text{ \AA}$, $c = 13.865(3) \text{ \AA}$ and $\beta = 97.73(3)^\circ$. The crystal undergoes two solid–solid phase transitions: at 355 K of first-order and at 155 K of second-order type. The later transition takes place between monoclinic phases: . The dielectric and pyroelectric measurements allow us to characterize the low temperature phase III as ferroelectric with the Curie temperature at 155 K. The saturated spontaneous polarization of the order of $2.6 \times 10^{-3} \text{ C m}^{-2}$ was measured along the a -axis (130 K). The ferroelectric phase transition mechanism at 155 K is due to the dynamics of three of five nonequivalent imidazolium cations.

Adres publiczny

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