

## Thermal and optical properties of the ferroelectric $(\text{C}_3\text{N}_2\text{H}_5)_5\text{Bi}_2\text{Cl}_{11}$ crystal.

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Thermal (specific heat) and optical (linear birefringence) studies were performed for a new ferroelectric crystal  $(\text{C}_3\text{N}_2\text{H}_5)_5\text{Bi}_2\text{Cl}_{11}$ . Two phase transitions were confirmed and described. The first-order paraelastic–ferroelastic phase transition at 360 K was studied with a polarizing microscope. The continuous second-order phase transition at 165 K to the ferroelectric phase is described by the Landau model using specific heat and linear birefringence data. The Landau expansion coefficients and are of an order of magnitude higher than the closely related ferroelectric crystal; MAPCB —  $(\text{CH}_3\text{NH}_3)_5\text{Bi}_2\text{Cl}_{11}$ . Thermal parameters (such as the excess enthalpy and the excess entropy) of the continuous transition were estimated and discussed. The ‘two-site’ model describing the motion of three of the five imidazolium cations, which is proposed from the structural studies, is fully confirmed by the data from the ac-calorimetric measurements.

### Słowa kluczowe

Ferroelectrics, Heat capacity, Optical properties

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