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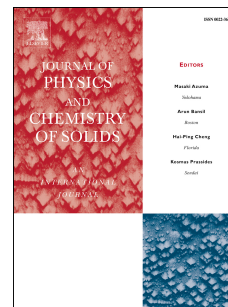
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## Structural phase transition and ferroelasticity in $(\text{H}_2\text{NNH}_3)_3\text{CdBr}_5$ crystal

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### Abstract

Single crystals of  $(\text{H}_2\text{NNH}_3)_3\text{CdBr}_5$  were grown and their properties were investigated. DSC, DTG, structural studies, optical polarized microscopy observations and dielectric studies are presented. TGA showed the stability of the substance up to about 455 K and decomposition above this temperature. DSC studies revealed the first order structural phase transitions at 294/292 on heating/cooling runs. X-ray structural studies showed a change of symmetry from orthorhombic to monoclinic and the transition seems to belong to the  $\text{mmmF2/m}$  Aizu's species. In optical studies performed with a polarizing microscope, the ferroelastic type of domain structure and the phase front appearance were observed. Dielectric measurements clearly evidenced the first-order phase transition as a jump-like decrease of permittivity on cooling and increase on heating. Structural and dielectric studies indicate the order-disorder character of the phase transition.

*Keywords:* organic – inorganic compounds; structural studies, phase transitions; DSC, DTA, DTG measurements; dielectric properties, optical observations;

### Highlights:

- Examination of the structural phase transition in the  $(\text{H}_2\text{NNH}_3)_3\text{CdBr}_5$  was performed
- The transition proceeds between two centrosymmetric groups  $\text{Cmcm} \leftrightarrow \text{P2}_1/\text{m}$
- The transition is of the first order and has the order – disorder character
- Ferroelastic domain structure is typical for the  $\text{mmmF2/m}$  of the Aizu's species

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