

Vibrational study of the structural phase transitions for the $(\text{CH}_3\text{NH}_3)_3\text{Sb}_2\text{Br}_9$ (MABA) and $(\text{CH}_3\text{NH}_3)_3\text{Bi}_2\text{Br}_9$ (MABB) crystals by infrared spectroscopy.

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Infrared spectra of polycrystalline $(\text{CH}_3\text{NH}_3)_3\text{Sb}_2\text{Br}_9$ (MABA) and $(\text{CH}_3\text{NH}_3)_3\text{Bi}_2\text{Br}_9$ (MABB) have been studied in the 90–300 K and 13–300 K temperature ranges, respectively. A systematic temperature dependence study of the internal modes has been carried out. The effects of the dynamical state of methylammonium (MA) cations on their vibrational spectra are discussed. In the higher temperature phases the i.r. spectra reflects the isotropic rotation of CH_3NH_3^+ cations. While in lower temperature phases numerous internal modes show splitting due to both non-equivalent cations in the lattice and a distinct change in their motional state

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