

Study of the structural phase transitions of $(\text{CH}_3\text{NH}_3)_3\text{Sb}_2\text{Cl}_9$ (MACA) and $(\text{CH}_3\text{NH}_3)_3\text{Bi}_2\text{Cl}_9$ (MACB) by infrared spectroscopy.

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Infrared spectra of polycrystalline $(\text{CH}_3\text{NH}_3)_3\text{Sb}_2\text{Cl}_9$ and $(\text{CH}_3\text{NH}_3)_3\text{Bi}_2\text{Cl}_9$ have been studied in the temperature range 90–300 K. A systematic temperature dependence study of the internal modes has been carried out. We discuss the effects of the dynamic state of methylammonium (MA) cations on their vibrational spectra. The results show that the dynamics of MA cations in both compounds is similar in higher (about 300 K) and lower temperature (in the vicinity of 100 K) regions. Substantial differences are revealed in the intermediate temperature interval. The results are in good agreement with earlier dielectric, calorimetric and ^1H NMR studies.

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