

Structure and dynamic dielectric behaviour of ferroelectric $[\text{NH}_2(\text{CH}_3)_2]_3\text{Sb}_2\text{Br}_9$ (DMABA).

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Rok wydania

2000

Czasopismo

Journal of Physics-
Condensed Matter

Numer woluminu

12

Strony

7509-7521

DOI

10.1088/0953-
8984/12/33/316

Kolekcja

Naukowa

Język

Angielski

Typ publikacji

Artykuł

Streszczenie

The crystal structure of DMABA has been determined at 293 and 180 K. It crystallizes in the monoclinic P21/c space group. The structure was refined to $R1 = 0.0466$ for 1269 independent reflections at 293 K and $R1 = 0.038$ for 1728 reflections at 180 K. DMABA is isomorphous with the chlorine analogue, DMACA. Its anionic sublattice forms corrugated two-dimensional layers in the bc plane. There are two crystallographically independent, disordered dimethylammonium cations in the crystal structure. One of them occupies cavities inside the polyanionic layers; the other is located between the layers. The temperature dependence of lattice parameters has been determined between 100 and 290 K. The presence of the ferro-paraelectric phase transition at 164 K has been confirmed. The complex dielectric permittivity of DMABA single crystals in the frequency range 100 Hz-10 GHz between 10 K and 300 K has been measured. The dynamic dielectric behaviour of DMABA is found to be determined by the properties of two independent relaxators: a low frequency one (~ 1 MHz at T_c) with a critical slowing down of its dynamics and a high frequency one (~ 5 GHz), which is thermally activated and contributes to the electric permittivity at least from about 80 K.

Adres publiczny

<https://doi.org/10.1088/0953-8984/12/33/316>

Strona internetowa wydawcy

<https://iopublishing.org/>