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Electrical, Dielectric and Nonlinear Optical Properties of SrB₄O₇

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The noncentrosymmetric optical borates are promising materials for modern high-power laser systems because of high nonlinear optical (NLO) coefficients, wide transparency windows including visible and UV ranges, and high optical damage thresholds, etc. One of such borates is SrB₄O₇ (SBO). Large single crystals of SBO with high optical qualities were grown by the Kyropoulos method [1]. SBO has been investigated as a potential NLO material with some excellent properties such as a transparency down to 120 nm, a high nonlinear coefficient, a high damage threshold, and no hygroscopicity [2]. Also, it was demonstrated that this crystal has the highest surface acoustic wave (SAW) velocity among piezoelectric crystals [3].

In this report, I will present the results of our investigation on the electrical and dielectric properties of SBO to describe its potential in terms of electronic application. For measurements, the SBO polycrystalline material was synthesized and analyzed by X-ray diffraction. After pellet preparation from the SBO powder, the measurements of current-voltage characteristic and temperature dependence of resistance were carried out. The study of dielectric parameters indicates that the SBO is a low dielectric constant and low dielectric loss material. These parameters are sufficiently stable at temperatures up to 200 °C. The NLO property of the synthesized material is investigated as well.

References

- [1] F. Pan, G. Shen, R. Wang, X. Wang, D. Shen, J. Crystal Growth 241 (2002) 108
- [2] Yu.S. Oseledchik, A.L. Prosvirnin, A.I. Pisarevskiy, V.V. Starshenko, V.V. Osadchuk, S.P. Belokrys, N.V. Svitanko, A.S. Korol, S.A. Krikunov, A.F. Selevich, Opt. Mater. 4 (1995) 669.
- [3] R. Komatsu and K. Ikeda, Proceedings of 150th Committee on Acoustic Wave Device Technology 68th Technical meeting, Vol. 1, 25 July 2000, (in Japanese with English abstract).

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