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Electrical properties of fresnoite Ba2TiSi2O8 using impedance spectroscopy

Abstract

Fresnoite with composition Ba2TiSi2O8 (B2TS2) was first found in 1965, adopting a non-centrosymmetric structure. It also reported to crystallize in a tetragonal unit cell with a=8.52Å and c=5.210Å leading to some possible application as hydrophone, transducer and second harmonic generation and low temperature co-fired ceramics (LTCC). B2TS2 were synthesized by conventional solid state reaction. Phase-pure B2TS2was obtained after heating the pellets at a final sintering temperature of 1230 °C in air at 92 h. Study found that Fresnoite B2TS2 is a type of materials which are not ferroelectric and instead show perfect dielectric insulator behaviour with resistance >106Ωcm at temperatures below 750°C and also shows nonideal debye respone. The activation energy for conduction of B2TS2 samples is very high, indicating that these materials are highly insulating.

Keywords

Ferroelectric; Fresnoite; Impedance spectroscopy and debye response