High temperature dielectric properties of cubic bismuth zinc tantalate.

ABSTRACT

Electrical properties of the parent phase in the Bi2O3–ZnO–Ta2O5 ternary system, cubic Bi1.5ZnTa1.5O7 (α-BZT), P, are investigated using impedance spectroscopy. P has permittivity (ε′) of 58, dielectric loss (tan δ) of 0.0023 at 30 °C and 1 MHz; temperature coefficient of capacitance (TCC) of −156 ppm/°C in the range of 30–300 °C at 1 MHz. A high degree of dispersion in the permittivity at low frequencies (<1 kHz) and temperatures above 500 °C is apparent. Dielectric losses exhibit non-frequency dependence at low temperatures presenting an increase at temperatures above 500 °C. A decrease of the loss occurs with increasing frequency.

Keyword: Pyrochlore; Permittivity; Dielectric loss; Temperature coefficient of capacitance.