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### **The Electrical Characteristics of Nb doped BaTiO<sub>3</sub> Ceramics**

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The Nb doped BaTiO<sub>3</sub> ceramics, with different Nb<sub>2</sub>O<sub>5</sub> content, ranging from 0.5 to 2.0 at% Nb, were investigated regarding their electrical characteristics in this paper. Nb/BaTiO<sub>3</sub> ceramics using in this investigation were prepared by the conventional solid state reaction and sintered at 1320 °C in an air atmosphere for 2 hours.

The dielectric characteristic of doped BaTiO<sub>3</sub> ceramics like as dielectric constant, dissipation factor, impedance (resistance, reactance) have been done by using LCR-Meter Agilent 4284A in the frequency range 20 Hz-1 MHz and Agilent E4991A RF Impedance/Material Analyzer for high frequency measurements (1 MHz – 3 GHz).

Dielectric constant and tangent losses after initial large values remains nearly independent of frequency greater than 3 kHz. Dielectric measurements were carried out as a function of temperature up to 180 °C. The low doped samples sintered at 1320 °C, display the high value of dielectric permittivity at room temperature, 2600 for 0.5Nb/BaTiO<sub>3</sub>. A nearly flat permittivity-temperature response was obtained in specimens with 2.0 at% additive content. The Curie-Weiss and modified Curie-Weiss law is used to clarify the influence of dopant on the dielectric properties and BaTiO<sub>3</sub> phase transformation. All investigated samples have an electrical resistivity  $\rho > 10^5 \Omega\text{cm}$  at room temperature.