

## **Synthesis and characterization of bismuth tantalate binary materials for potential application in multilayer ceramic capacitors (MLCC)**

### **ABSTRACT**

The single phase bismuth tantalate (BiTaO<sub>4</sub>) was successfully synthesized by conventional solid-state method at sintering temperature 1100°C. This material crystallized in a triclinic system, space group P with  $a = 7.6585$  Å,  $b = 5.5825$  Å,  $c = 7.7795$  Å,  $\alpha = 90.03^\circ$ ,  $\beta = 77.04^\circ$  and  $\gamma = 86.48^\circ$ , respectively. The electrical properties of BiTaO<sub>4</sub> were characterized by AC impedance analyzer, HP4192 at temperature ranging from 25°C to 850°C over frequency range of 5 to 13 MHz. The sample was highly resistive as the conductivities were unlikely to be determined below 550°C. On the other hand, BiTaO<sub>4</sub> exhibited moderate dielectric constant,  $\epsilon_r = 47$  at ambient temperature in the frequency region of 1 MHz and near zero temperature coefficient of capacitance (TCC), 0.00022, making it a potential candidate for multilayer ceramic capacitors (MLCC).

**Keyword:** Solid-state method; Electroceramics; Dielectric constant; AC impedance spectroscopy