

## Synthesis and impedance studies of CuTa<sub>2-2x</sub>O<sub>6-5x</sub> perovskites

### ABSTRACT

Polycrystalline samples of CuTa<sub>2-2x</sub>O<sub>6-5x</sub> are successfully synthesised by solid state reaction at 975 °C over 24 hours and the solid solution limit is confirmed as  $0.1 \leq x \leq 0.2$ . The samples are fully indexed based on cubic structure in the space group, Pmmm, International Centre for Diffraction data (ICDD) number 70-611. The refined lattice parameters for CuTa<sub>1.8</sub>O<sub>5.5</sub> ( $x = 0.1$ ) and CuTa<sub>1.6</sub>O<sub>5</sub> ( $x = 0.2$ ) are  $a = 7.5117$  (4) and  $7.5070$  (16), respectively. The determined grain sizes for both samples are in the range of 0.5-3.0  $\mu\text{m}$  for  $x = 0.1$  and 1.0-4.0  $\mu\text{m}$  for  $x = 0.2$ . Besides, the samples show no thermal change in a wide range of temperature studied. Meanwhile, high relative permittivity exhibited by sample  $x = 0.2$  at room temperature is also accompanied with high dielectric loss. The recorded activation energies,  $E_a$  are relatively low  $\sim 0.28$ - $0.33$  eV and high conductivity in higher copper content sample. i.e.,  $x=0.2$  is probably attributed to the conductive behavior of copper. © 2013 American Scientific Publishers All rights reserved.

**Keyword:** Electrical properties; Perovskite; Solid state method; X-ray diffraction.