

## Synthesis and impedance studies of $\text{CuTa}_{2-2x}\text{O}_{6-5x}$ perovskites

### ABSTRACT

Polycrystalline samples of  $\text{CuTa}_{2-2x}\text{O}_{6-5x}$  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  $\text{CuTa}_{1.8}\text{O}_{5.5}$  ( $x = 0.1$ ) and  $\text{CuTa}_{1.6}\text{O}_5$  ( $x = 0.2$ ) 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.