

# 1. Electrical Conduction In CuO-B<sub>2</sub>O<sub>3</sub> Glasses

W. J. Gawande, S. S. Yawale S. P. Yawale

## ABSTRACT

Due to the technological importance of CuO-B<sub>2</sub>O<sub>3</sub> glasses, dc-conductivity measurement with increasing concentration of CuO (in the range of 10-35 mol%) have been reported in the temperature range of 313-573 K in the present study. A plot of  $-\log \sigma$  versus  $1/T$  shows two different regions of conduction suggesting two types of conduction mechanisms switching from one type to another occurring at knee temperature. The DC conductivity increases with increase in temperature of the sample and also with increase of mol% of CuO. Activation energy calculated from both regions (LTR and HTR) is below 1 eV. Thus electrical conduction is electronic. Activation energy in LTR and HTR are temperature independent but composition dependent. The values of dielectric constant at different temperature (313-573K) at a constant frequency of 1 KHz are reported. It is observed that the dielectric constant is independent of temperature upto certain temperature range, but after that the dielectric constant increases with temperature rapidly. The dielectric constant of all the samples studied is found to be composition dependent. In the glasses studied dipole relaxation phenomenon is observed.

**Keywords :** CuO-B<sub>2</sub>O<sub>3</sub> glasses, DC-conductivity, dielectric constant.