

## Electrical Conductivity and Dielectric Properties of $\text{Se}_{100-x}\text{Te}_x$ Alloy

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### Abstract

In this study we have investigate the temperature dependent dc conductivity and dielectric properties and of  $\text{Se}_{100-x}\text{Te}_x$  alloy ( $x=4, 8, 12, 16$ ). The frequency and temperature dependence of dielectric constant  $\epsilon'$  and dielectric loss  $\epsilon''$  is studied in the frequency range of 1 KHz-1 MHz, and in the temperature range 290-360K. The dielectric constant  $\epsilon'$  and dielectric loss  $\epsilon''$  show a decrease with increasing frequency and an increase with increasing temperature. All sample show the dielectric dispersion, due to the distribution of the relaxation time induced by polarized species. The activation energy is also evaluated from Arrhenius plot of Dc conductivity, which is due to the tunneling effect of trapped electron "hopping" from one trap site to another.

**Keywords** dielectric constant, dielectric loss, Dc conduction loss, Dc conductivity, Activation energy

### Introduction

Chalcogenide glasses are novel materials have attracted researcher because of their potential use and extensive application in solid state devices, such as ultra high density phase change storage and memory, photo voltaic, thermal imaging, switching memory, photo detectors, photo receivers etc [1-7]. Low phonon energy makes these glasses transparent to I-R region.

Se based alloy show high transparency in mid I-R region, non-linear properties and also have a variety of photo-induced effect, which are useful for all- optical switching [8-9].

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