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# Dielectric Properties of Thalium Selenide Thin Films at Radio Wave Frequencies

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**Abstract :** Thalium Selenide (TlSe) is used for optoelectronic devices, pressure sensitive detectors, and gamma-ray detectors. The TlSe samples were grown as large single crystals using the Stockbarger-Bridgman method. The thin films, in the form of Al/TlSe/Al, were deposited on the microscope slide in different thicknesses (300-3000 Å) using thermal evaporation technique at 10-5 Torr. The dielectric properties of (TlSe) thin films, capacitance (C) and dielectric loss factor (tanδ), were measured in a frequency range of 10-105 Hz, and temperatures between 213K and 393K via Broadband Dielectric Spectroscopy analyzer. The dielectric constant (ε') and the dielectric loss (ε'') of the thin films were derived from measured parameters (C and tanδ). These results showed that the dielectric properties of TlSe thin films are frequency and temperature dependent. The capacitance and the dielectric constant decrease with increasing frequency and decreasing temperature. The dielectric loss of TlSe thin films decreases with increasing frequency, on the other hand, they increase with increasing temperature and increasing thicknesses. There is two relaxation region in the investigated frequency and temperature interval. These regions can be called as low and high-frequency dispersion regions. Low-frequency dispersion region can be attributed to the polarization of the main part of the chain structure of TlSe while high-frequency dispersion region can be attributed to the polarization of side parts of the structure.

**Keywords :** thin films, thallium selenide, dielectric spectroscopy, binary compounds
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