

## The Electrical Switching Properties of $\text{Ge}_{10}\text{Se}_5\text{Sb}_{85}$ Chalcogenide Glass

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Bulk ingot material of the ternary mixture  $\text{Ge}_{10}\text{Se}_5\text{Sb}_{85}$  was prepared by direct fusion of high purity constituent elements in vacuum sealed silica tube. The glassy nature of the prepared sample was confirmed by the X-ray diffraction (XRD) technique. Current - Voltage characteristics of the investigated glass have been carried out at different thicknesses and temperatures. Switching phenomenon at the turn-over point (TOP) from a high-resistance state (OFF state) to a negative-differential resistance-state (NDRS) was detected where the threshold parameters such as threshold dissipated power ( $P_{th}$ ), threshold voltage ( $V_{th}$ ), threshold current ( $I_{th}$ ), threshold electric field ( $E_{th}$ ) and threshold resistance ( $R_{th}$ ) were determined at different thicknesses and ambient temperatures of the investigated samples. At the turn-over point, the activation energies ( $\Delta E_p$ ,  $\Delta E_v$ ,  $\Delta E_i$ ,  $\Delta E_r$  and  $\Delta E_f$ ) caused by the threshold dissipated powers, threshold voltages, threshold currents, threshold resistances and threshold electric fields respectively, were deduced at different thicknesses of the samples. The increasing in the ambient temperature of the investigated material ( $\Delta T_j$ ), the temperature of the conduction path ( $T^*$ ) and the Poole-Frenkel coefficient ( $\beta_{PF}$ ) were determined at different ambient temperatures and thicknesses of the samples on the basis of the Joule heating effects. The activation energy of hopping ( $W$ ), the activation energy of conduction  $\Delta E_\sigma$ (eV), the hopping distance ( $d$ ) of the charge carriers and the density of localized states  $N(E)$  were carried out due to Poole-Frenkel effect.