



Effect of aging and temperature on alternating current conductivity of tellurium thin films

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Abstract

The impedance spectra of tellurium films with interdigital platinum electrodes were investigated in air at temperatures between 10 and 50 °C. Cole–Cole analysis made it possible to assess time constants, resistance, and capacitance of the film at characteristic frequencies and the dependence of these parameters on aging and temperature. Aging under normal conditions over 12 months led to a relative increase of only ~5% in film impedance at the characteristic frequency. However, aging noticeably influences the electrical resistance of the film at high (>500 kHz) frequencies, and capacitance diminished after 12 months by more than 50% throughout the spectrum. Scanning electron microscopy confirmed that the effect of aging is due to structural changes in the film. Temperature does not influence the capacitance of the film but uncommonly influences its resistance, which reaches a maximum at around 20 °C. This is ascribed to desorption of oxygen previously adsorbed from the environment.