Influence of radiation on the optical parameters of Ag10Te90 thin films

A.Abu-Fadla ,M.M.Hafiz ,M.M.Wakaad ,A.S.Ashour

Abstract:

Amorphous Ag10Te90 thin films were prepared onto glass substrates using the thermal evaporation method. The effect of γ-irradiation on the optical parameters was investigated in the dose range 10–180 krad. The optical absorption coefficient (α) for the as-deposited and irradiated films has been determined from the reflectance (R) and transmittance (T) measurements in the wavelength range 400–900 nm. Analysis of the spectral behavior of the absorption coefficient in the absorption region revealed direct transitions. The optical studies showed the decrease in band gap (Eopt) with an increase in γ-irradiation. The width of the tails of localized states (Ee) were calculated and found to be increasing after γ-irradiation. Dielectric related optical constants, such as (n, kex., ε1 and ε2), were presented. Finally, the effect of γ-irradiation on the high-frequency dielectric constant (εL) and carrier concentration (N/m*) is also studied. The results were discussed by the change on the degree of disorder as well as the radiation-induced effect on solids.

Keywords:

Chalcogenide glasses; Ag10Te90 thin films; Optical parameters; γ-Irradiation

Published In:

Radiation Physics and Chemistry , Vol. 76, No. 1 , pp. 61-66