

PHOTOSTABILITY OF PULSED LASER DEPOSITED GEXASYTE100-X-Y AMORPHOUS THIN FILMS

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Abstract

Amorphous thin films from Ge-As-Te system were prepared by pulsed laser deposition to study their photostability. Photostability of fabricated films was studied by spectroscopic ellipsometry within as-deposited as well as relaxed (annealed 20°C below glass transition temperature) layers. For irradiation, laser sources operating below band gap of thin films (1064 nm, i.e. 1.17 eV), over band gap (1550 nm, i.e. 0.80 eV), and equal to band gap (1342 nm, i.e. 0.92 eV) were used. Relaxation (annealing) of the layers was performed in an inert atmosphere of argon. Laser exposures were performed in an inert atmosphere of nitrogen. Three studied compositions (Ge₁₀As₅₀Te₄₀, Ge₁₀As₆₀Te₃₀, and Ge₂₀As₂₀Te₆₀) showed photostability under all used laser exposures; the changes in their optical band gap and refractive index were found to be equal or less than 0.02 eV and 0.02, respectively.

Keywords: Amorphous materials, Laser deposition, Thin films, Chalcogenides, Optical properties

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