

Effect of substrate temperature on the structural, optical and electrical properties of Silver Indium selenide films prepared by laser ablation

Dinesh Pathak[†], R. K. Bedi[†], Davinder Kaur^{*}

[†]Material Science Laboratory, Department of Physics,
Guru Nanak Dev University, Amritsar – 143005, India.

^{*}Department of Physics and Centre of Nanotechnology,
Indian Institute of Technology Roorkee, India

PACS Numbers-[78.40Fy, 78.66-w, N61.05cp, 68.37.Ps] :Semiconductors ,Optical Properties of thin
films ,X-Ray Diffraction ,Atomic Force microscopy .

Abstract

Laser ablation has attracted special interest for the growth of thin films .It allows the formation of high quality layers and maintain stoichiometry in the films of even very complex elemental materials. In this communication high quality AgInSe₂ (AIS) films were grown onto the glass substrates kept at different temperature using ultra-high-vacuum pulsed laser deposition technique from the AIS target synthesized from high-purity materials. It has been observed that compositional stoichiometry is largely maintained in the films .This suggest that PLD could be used as technique for fabrication of ternary semi conducting films. The X-ray diffraction studies of the films show that films are textured in (112) direction. The structural, optical and electrical properties have been investigated as a function of substrate temperature. An increase in substrate temperature results in more ordered structure. Roughness of the films is found to increase at higher deposition temperatures. The optical studies of the films show that the optical band gap lie in the range 1.20 -1.27 eV. The activation energy has been found in the range 0.0103 - 0.0556 eV