Title:	Impact of Hydrogen flow rate on physical properties of ZnS thin films: As potential buffer layer in solar cells
Authors:	Chander, S. (/jspui/browse?type=author&value=Chander%2C+S.)
Keywords:	ZnS thin films e-beam evaporation Hydrogenation Physical properties Buffer layer
Issue Date:	2020
Publisher:	Elsevier B.V.
Citation:	Optical Materials, 105
Abstract:	The exceptional need of potential Cd-free buffer layer in thin film solar cell devices motivated us to study the role of post-deposition Hydrogen annealing for the optimization of physical properties of ZnS thin films. The deposited films of thickness 200 nm were hydrogenated within the flow rate range of 50.0–150.0 sccm at 200 °C. XRD analysis revealed transformation of amorphous into cubic phase with maximum crystallinity at 150.0 sccm for films deposited on glass substrate while into wurtzite structure for films on ITO substrate with enhanced crystallinity. A mixed phase (cubic and hexagonal) at 150.0 sccm also appeared. Electrical behaviour (I–V) exhibits ohmic nature with maximum carrier concentration at 100.0 sccm. The blue shift in absorption edge and maximum of 95% transmittance were recorded in the visible region with optical energy band gap of 3.41 eV at 150.0 sccm. The reduction in surface roughness is observed in surface topographical analysis while the photoluminescence (PL) study indicated a sharp peak at 2.95 eV with strongest emission for 150.0 sccm attributed to reduction of defects at interstitial sites and passivation of grain boundaries. These results are useful to understand the Hydrogen related impurities in ZnS films and the improvement caused by hydrogenation to physical properties suited for buffer layer in solar cells.
Description:	Only IISERM authors are available in the record.
URI:	https://www.sciencedirect.com/science/article/pii/S0925346720302469?via%3Dihub (https://www.sciencedirect.com/science/article/pii/S0925346720302469?via%3Dihub) http://hdl.handle.net/123456789/3261 (http://hdl.handle.net/123456789/3261)
Appears in Collections:	Research Articles (/jspui/handle/123456789/9)

Files in This Item:

File	Description	Size	Format	
Need to add pdf.odt (/jspui/bitstream/123456789/3261/1/Need%20to%20add%20pdf.odt)		8.63 kB	OpenDocument Text	View/Open (/jspui/bitstream/12345

Show full item record (/jspui/handle/123456789/3261?mode=full)

(/jspui/handle/123456789/3261/statistics)