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Giant photocontraction effects in obliquely-deposited chalcogenide glass thin-films* M. JIN, P. BOOLCHAND, University of Cincinnati, T. RAJAGOPALAN, K.L. CHOPRA, Indian Institute of Technology, New Delhi — Ge_xSe_{1-x} thin-films at several obliqueness angles α (= 0, 20, 45, 60, 80) and compositions x (= 0.15, 0.20, 0.23, 0.25 and 0.33) were vapor-deposited, and examined in Raman scattering and SEM measurements both in the pristine and illuminated state. The films, placed in an inert ambient, were exposed to Hg lamp radiation, and photo-contraction of the films established using a profilometer. Raman scattering of the pristine and exposed films were studied as a function of depth using a confocal microscope attachment. Our results show (i) Raman scattering of the normally deposited ($\alpha = 0$) films in the pristine state are similar to those of corresponding bulk glasses, (ii) obliquely deposited films at x = 1/3 reveal Raman lineshapes that change qualitatively with α, suggestive of nanoscale phase separation of the films, while those at x = 0.23 show Raman lineshapes that are largely independent of α, (iii) the photocontraction effect maximizes in the $0.20 < x < 0.25$ range, confirming the earlier finding (ref1) (iv) light illumination partially undoes effects associated with nanoscale phase separation. Possible interpretation of these results in relation to origin of photocontraction effects will be presented. *Supported by NSF grant DMR 04-56472. 1.Bhanwar Singh, S. Rajagopalan, P. K. Bhat, D. K. Pandya and K. L. Chopra, Solid State Communications, Vol. 29, pp. 167-169 (1979)

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