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**Substrate- and interface-mediated photocrystallization in a-Se films and multi-layers** G.P. LINDBERG, R.E. TALLMAN, B.A. WEINSTEIN, SUNY Buffalo, NY 14260-1500 USA, S. ABBASZADEH, K.S. KARIM, Univ. of Waterloo, Ontario, N2L 3G1 CA, A. REZNIK, TBRI, Thunder Bay, Ontario P7B 5E1 CA — Photocrystallization in a-Se films and layered a-Se structures is studied by Raman scattering as a function of temperature for photon energies near or slightly below the band gap. The samples are $\sim$16.5 $\mu$m thick films of a-Se grown i) directly on glass, ii) on indium tin oxide (ITO) coated glass, iii) on glass that is spin coated with 800nm polymide, and iv) on a Capton sheet. A low As-concentration ($< 0.2$ %) is present in several of the a-Se films. We compare the results on these samples to prior findings on a-Se HARP targets, and on a polymer-encapsulated a-Se film [1]. We observe strong evidence that the interface between the a-Se film and the underlying substrate and/or multi-layers plays an important role in the onset time and growth rate of photocrystallized Se domains. In some samples a discontinuous increase in the onset time with increasing temperature occurs near the glass transition ($\sim$310K), and there is a surprising "dead zone" of no crystallization in this region. Other samples merely show a minimum in the onset time at similar temperatures, but no discontinuity and no region where crystallization is absent. Soft intermediate layers appear to increase stability against crystallization in an overlying a-Se film. The competing effects of substrate shear strain and thermal driving forces on the photocrystallization process are considered to account for these findings.

[1] R.E. Tallman et. al. J. Non-crystalline Sols. **354,** 4577-81 (2008)

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