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Competing effects in the photo-crystallization of a-Se HARP films R.E. TALLMAN, B.A. WEINSTEIN, Physics Dept., SUNY at Buffalo, A. REZNIK, J.A. ROWLANDS, Sunnybrook Health Sciences Centre, Toronto, M. KUBOTA, K. TANIOKA, NHK Laboratories, Tokyo — Photo-crystallization of amorphous (a-) Se is investigated as a function of temperature (T = 250–340 K) and exposure time by Raman scattering in photo-active films used in high-gain avalanche rushing photoconductor (HARP) cameras. We observe different temperature regimes that reflect the competition of viscosity-driven and strain-driven processes. No photo-crystallization is seen below 260K, and above 318K the crystallization rate is thermally enhanced. For 260–302 K the onset time for photo-crystallization decreases with increasing temperature, but the crystallization rate is T-independent. *Surprisingly*, photo-crystallization is strongly suppressed in a 15 degree range around the glass transition at $T_g \sim 310$K. Our results are in qualitative accord with a theory by Stephens[1] that treats the effects of local strain on the growth of crystalline-Se domains within an a-Se matrix – the strain arising from the density difference between the crystalline and amorphous phases. [1] R.B. Stephens, J. Appl. Phys. **51**, 6197 (1981).

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