

Abstract Submitted  
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**Formation of nano-domains during the ZB-B1 high-pressure transition in bulk ZnSe** R.E. TALLMAN, B.A. WEINSTEIN, P. ZHANG, Physics Dept., SUNY at Buffalo, V. IOTA, H. RHEE, Lawrence Livermore National Laboratory, M.A. MARCUS, Lawrence Berkeley Laboratory — Raman scattering and x-ray absorption spectroscopy (XAS) are applied to explore the early-stage nucleation of the zincblende-rocksalt high-pressure transition in ZnSe. The Raman spectra (300K) of both natural ZnSe and high-quality vapor-grown ZnSe exhibit extreme broadening in the region of the TO( $\Gamma$ ) phonon for pressures  $\sim 2.5$  GPa below the onset of the opaque high-pressure phase. At the same time sharp features persist in the spectra, *e.g.*, due to the resonantly enhanced LO( $\Gamma$ ) peak and the 2TA(X) and 2TA(L) critical points. These results indicate that the high-pressure rocksalt phase in ZnSe tends to form in nanoscale domains due to a high density of nucleation sites. In order to explore the nucleation process further, XAS measurements are carried out under applied pressure on a ZnSe film containing  $\sim 10^{21}$  cm $^{-3}$  As-impurities as an easily identifiable source of nucleation sites. Comparisons of the XAS results at 1 atm. and 6.5 GPa support the early onset of disorder consistent with nano-domain formation and the Raman findings.

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