

Poster Presentations

Mechanical properties of the CdSe/GaSe and CdSe/InSe bilayers

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Abstract

In this study we have grown a 100 nm thick InSe and GaSe onto polycrystalline CdSe thin films. The double layers are focused to X-ray diffraction beam of power of 1.2 kW. The X-ray diffraction patterns for the two types of the films are analyzed to fix the effect of the replacement of GaSe with InSe on the mechanical properties of the CdSe thin layer. The calculated lattice parameters, Miller indices, micro-strain, dislocation density, grain size and degree of orientation are observed to be highly influenced by this replacement. Namely, the micro-strain decreased from 0.0121 to 0.0077 and the grain size increased from 14.2 nm to 21.3 nm. Consistently, the defect density in the CdSe decreased from 2.39×10^{12} to 2.83×10^{11} line/cm², when the CdSe is covered by InSe instead of GaSe. These improvements in the mechanical properties are promising as they indicate lower energy barrier height to the electron motion as a result of decreased strain and larger grain size.

Keywords: InSe; hopping parameters; density of localized states.