

Accepted Manuscript

Formation of CdSe nanocrystals in Cd-doped thin arsenic selenide films under laser irradiation

Yu.M. Azhniuk, D. Solonenko, E. Sheremet, V.Yu. Loya, I.V. Grytsyshche, S. Schulze, M. Hietschold, A.V. Gomonnai, D.R.T. Zahn



PII: S0040-6090(17)30458-3
DOI: doi: [10.1016/j.tsf.2017.06.023](https://doi.org/10.1016/j.tsf.2017.06.023)
Reference: TSF 36030

To appear in: *Thin Solid Films*

Received date: 6 December 2016

Revised date: 8 June 2017

Accepted date: 9 June 2017

Please cite this article as: Yu.M. Azhniuk, D. Solonenko, E. Sheremet, V.Yu. Loya, I.V. Grytsyshche, S. Schulze, M. Hietschold, A.V. Gomonnai, D.R.T. Zahn, Formation of CdSe nanocrystals in Cd-doped thin arsenic selenide films under laser irradiation, *Thin Solid Films* (2017), doi: [10.1016/j.tsf.2017.06.023](https://doi.org/10.1016/j.tsf.2017.06.023)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Formation of CdSe nanocrystals in Cd-doped thin arsenic selenide films under laser irradiation

Yu.M. Azhniuk^{1,2}, D. Solonenko³, E. Sheremet⁴, V.Yu. Loya¹,
I.V. Grytsyshche¹, S. Schulze⁴, M. Hietschold⁴,
A.V. Gomonnai^{1,2}, D.R.T. Zahn³

¹ *Institute of Electron Physics, Ukr. Nat. Acad. Sci.,
21 Universytetska Str., 88017 Uzhhorod, Ukraine,
e-mail: yu.azhniuk@gmail.com*

² *Uzhhorod National University, Uzhhorod 88000, Ukraine*

³ *Semiconductor Physics, Technische Universität Chemnitz,
D-09107 Chemnitz, Germany*

⁴ *Solid Surface Analysis, Technische Universität Chemnitz,
D-09107 Chemnitz, Germany*

Abstract. Amorphous Cd-doped As₂Se₃ films with nominal Cd contents up to 12 at. % were prepared by thermal evaporation. Atomic force microscopy studies confirm the uniform film structure with surface roughnesses below 1 nm, independent of the Cd content. As shown by energy-dispersive X-ray spectroscopy, the Cd content in the film reveals a strong gradient and decreases with the film depth. For heavily Cd-doped (above 7 at. %) As₂Se₃ films, Raman features attributed to CdSe longitudinal optical (LO) phonon and its overtone (2LO) are revealed in the Raman spectra as an evidence for the formation of CdSe nanocrystallites in the As₂Se₃:Cd film under above-bandgap or below-bandgap laser illumination. The CdSe nanocrystallites undergo tensile strain due to a photoplastic effect in the As₂Se₃ film, *i. e.* partial removal of the material from the laser spot. The tensile strain value, estimated from the LO phonon frequency shift, is shown to reach nearly 2 GPa.

Download English Version:

<https://daneshyari.com/en/article/8032847>

Download Persian Version:

<https://daneshyari.com/article/8032847>

[Daneshyari.com](https://daneshyari.com)