



# **ABSTRACT BOOK**

**International research  
and practice conference:**

**NANOTECHNOLOGY  
AND NANOMATERIALS  
(NANO-2017)**

**23 - 26 August 2017  
Chernivtsi  
Ukraine**

**INTERNATIONAL RESEARCH  
AND  
PRACTICE CONFERENCE  
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**BOOK OF ABSTRACTS**

**The International research and practice conference “Nanotechnology and nanomaterials” (NANO-2017).** Abstract Book of participants of the International Summer School and International research and practice conference, 23-26 August 2017, Chernivtsi. Edited by Dr. Olena Fesenko. – Kiev: SME Burlaka, 2017. – P. 854.

This book contains the abstracts of contributions presented at the International research and practice conference “Nanotechnology and Nanomaterials” (NANO-2017).

The NANO-2017 Conference was organized by the Institute of Physics of NAS of Ukraine with the participation of the Yuriy Fedkovych Chernivtsi National University (Ukraine), University of Tartu (Estonia), University of Turin (Italy), Pierre and Marie Curie University – Paris 6 (France) and Representative office of Polish Academy of Sciences in Kiev.

NANO-2017 was the fifth conference in the series of NANO-conferences initiated by the Institute of Physics of NAS of Ukraine in 2012 in the framework of FP7 Nanotwinning project. From year to year, they attract more attention and participants. In 2012, the first meeting was held in the format of International Summer School for young scientists "Nanotechnology: from fundamental research to innovations". The 2013 and 2014 conferences were organized in conjunction with the International Summer Schools for young scientists under the same title. In 2013, this event was attended by more than 300 scientists, in 2014-2015, 450 scientists took part and in 2016 it gathered above 650 participants from Ukraine, Poland, Italy, Estonia, France, Austria, Germany, Greece, Turkey, USA, Romania, Moldova, Czech Republic, Taiwan, Lithuania, Egypt, Iran, India, Algeria, Indonesia and other countries. In 2017 Organizer Committee has received more than 700 application forms from about 25 countries of the world.

The NANO-2017 conference brought together leading scientists and young researchers from many countries of the world. This year its topics were as follows: Nanoobjects' microscopy; Nanocomposites and nanomaterials; Nanostructured surfaces; Nanooptics and photonics; Nanoplasmonics and surface enhanced spectroscopy; Nanochemistry and biotechnology; Nanoscale physics; Physico-chemical nanomaterials science.

This year the NANO-2017 Conference was organized in the framework of the NAS of Ukraine Program «Fundamental issues of creation of new nanomaterials and nanotechnologies» for 2015–2019.

Website of the Nano-2017 conference: <http://www.iop.kiev.ua/~nano2017/>

ISBN: 978-966-97587-3-6

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## Surface XPS and UPS investigation of in situ prepared $\text{As}_x\text{Se}_{100-x}$ nanolayers and their modification under external influence

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The surface structuring and processes occurring at the surface and sub-surface nanolayers and related changes of physico-chemical properties of the surface play a crucial role for the modern application of nanomaterials. Therefore, the characterization of local structure of the surface and its modification induced by external influence are of great scientific importance from both fundamental and applied points of view [1].

In this report, we focused on amorphous  $\text{As}_x\text{Se}_{100-x}$  ( $x=40, 50$ ) thin films with thickness of about  $0.1 \mu\text{m}$  prepared in situ by thermal evaporation from bulk glass onto cleaned (100) Si wafer substrates, which were then annealed and aged during 1 week in air. The atomic stoichiometry, local chemical structure as well as electronic properties of the surfaces of as-deposited, annealed and aged As-Se nanolayers were examined by XPS and UPS methods. The formation of additional Se-Se and As-As homopolar bonds and appearance of oxygen on the surfaces of materials due to aging effect were observed and the related chemical re-bonding is discussed in detail. A DFT electronic structure calculations were also performed in order to assist the unambiguous interpretation of the experimental results.

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1 O. Kondrat, R. Holomb, A. Csik, V. Takats, M. Veres and V. Mitsa, Coherent light photo-modification, mass transport effect and surface relief formation in  $\text{As}_x\text{S}_{100-x}$  nanolayers: absorption edge, XPS and Raman spectroscopy combined with profilometry study, *Nanoscale Research Letters* 2017, 12:149, DOI:10.1186/s11671-017-1918-y.