



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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AND NANOMATERIALS”
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BOOK OF ABSTRACTS

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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/>

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Free-volume entities in the $\text{Cu}_{0.4}\text{Co}_{0.4}\text{Ni}_{0.4}\text{Mn}_{1.8}\text{O}_4$ ceramics studied by PAL tools

*Klym H.¹, Shpotyuk O.², Ingram A.³, Hadzaman I.⁴,
Chaly D.⁵, Popov A.I.⁶, Lys R.⁷*

- ¹ Lviv Polytechnic National University, Bandery str., 12, Lviv-79013, Ukraine
E-mail: halyna.klym@lpnu.ua; klymha@yahoo.com
- ² Vlokh Institute of Physical Optics, Dragomanova str., 23, Lviv-79005, Ukraine
- ³ Opole University of Technology, Ozimska str., 75, Opole- 45370, Poland
- ⁴ Drohobych State Pedagogical University,
I. Franko str., 24, Drohobych-82100, Ukraine
- ⁵ Lviv State University of Life Safety, Kleparivska str., 35, Lviv-79000, Ukraine
- ⁶ Institute for Solid State Physics, University of Latvia,
Kengaraga 8, LV-1063 Riga, Latvia
- ⁷ Ivan Franko National University of Lviv.
Tarnavskogo Str. 107, Lviv-79017, Ukraine

Functional temperature-sensitive ceramics based on mixed transition-metal manganites is one of the typical representatives of so-called topologically disordered substances having wide industrial applications. In this work free-volume entities in functional ceramics [1] are studied with positron annihilation lifetime measurements. Obtained results are interpreted in terms of unified multi-channel positron annihilation model involving both positron trapping and ortho-positronium decay modes. For mixed transition-metal manganite $\text{Cu}_{0.4}\text{Co}_{0.4}\text{Ni}_{0.4}\text{Mn}_{1.8}\text{O}_4$ ceramics it is shown that a strict correlation exists between numerical values of free volume of potential positron traps and lifetime parameters. The extended defects near grain boundaries are supposed to be responsible for middle component at the level of 0.4 ns. The small third component is due to “pick-off” annihilation of o-Ps in the intergranular nanovoids. The observed o-Ps lifetime ~ 1.8 ns is related to the nanopores with radius of ~ 0.27 nm based on classic Tao-Eldrup equation. The reported data are addition information to Hg- porosimetry and scanning electron microscopy results.

1 Shpotyuk O., Brunner M., et. al. Analytical description of degradation relaxation transformations in nanoinhomogeneous spinel ceramics // *Nanoscale research letters*, 2016, 11:499, pp.1-6.