



ABSTRACT BOOK

International research
and practice conference:

**NANOTECHNOLOGY
AND NANOMATERIALS
(NANO-2022)**

25-27 August 2022
Lviv, Ukraine

**INTERNATIONAL RESEARCH
AND PRACTICE CONFERENCE
“NANOTECHNOLOGY
AND NANOMATERIALS”**

(The NANO-2022 Conference is dedicated
to the International Year of Basic Sciences
for Sustainable Development)

25-27 of August 2022

Lviv, UKRAINE

Abstract book

The International research and practice conference “Nanotechnology and nanomaterials” (NANO-2022). Abstract Book of participants of the International research and practice conference, 25–27 August 2022, Lviv. Edited by Dr. Olena Fesenko. – Kyiv: LLC APF POLYGRAPH SERVICE, 2022. – P. 542.

This book contains the abstracts of contributions presented at the International research and practice conference “Nanotechnology and Nanomaterials” (NANO-2022).

The NANO-2022 Conference was organized by the Institute of Physics of NAS of Ukraine with the participation of the University of Tartu (Estonia), the Lviv Polytechnic National University, University of Turin (Italy) and Pierre and Marie Curie University – Paris 6 (France).

NANO-2021 was the ninth 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 2014-2017, 450 scientists took part and in 2018 it gathered above 650 participants. In 2021 conference was attended by more than 700 scientists 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 2021 the Organizer Committee has received more than 800 application forms from about 25 countries of the world.

The NANO-2022 conference brought together leading scientists and young researchers from many countries of the world. This year its topics were as follows: Nanobiotechnology for health-care; Nanochemistry and biotechnology; Nanocomposites and nanomaterials; Nanoobjects microscopy; Nanooptics and photonics; Nanoplasmonics and surface enhanced spectroscopy; Nanoscale physics; Nanostructured surfaces; Physico-chemical nanomaterials science.

Website of the Nano-2022 conference: <http://nano-conference.iop.kiev.ua>

In order to support the formation of the communications between the scientific and innovation communities the EEN-Ukraine consortium together with EEN partners in Germany organized STARTUP2022 competition for selection 10 the best Ukrainian startups for participation in the Start-up BW Summit, Germany.

LaVO₄:Eu³⁺ nanoparticles show no genotoxicity on fibroblast cultures

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Therapeutic efficacy of any drug used in clinical medicine should prevail over its possible toxic effects. One of the manifestations of the negative impact of drugs on cells is genotoxicity, which has to be evaluated in screening of potential drugs, including nanomaterials.

The aim of this study was to assess the genotoxicity of lanthanum orthovanadate nanoparticles (LaVO₄:Eu³⁺) on fibroblast cultures.

Materials and methods. Genotoxicity was analyzed using the micronucleus assay. According to the protocol, dermal fibroblasts of rat fetuses were cultivated in DMEM enriched with 10% fetal bovine serum in a CO₂ incubator. The cells underwent 3 passages. The cells were transferred into a 24-well plate at 50 000 cells per well. Thereafter, LaVO₄:Eu³⁺ nanoparticles were added (0-30-65-130-260-520 µg / ml). For a positive control, the cells were incubated with cisplatin. For a negative control, the intact cells were used. Following 72 hours, the fibroblasts were fixed using alcohol and stained (Romanowsky – Giemsa staining). The amount of fibroblasts with micronuclei was analyzed and compared. Statistical analysis was carried out by Kraskel-Wallis and Dunn's tests.

Results. When lanthanum orthovanadate nanoparticles (LaVO₄:Eu³⁺) were added to fibroblast cell cultures at concentrations of 30-65-130 µg / ml, the number of cells with micronuclei did not differ statistically significantly from cultures without nanoparticles. Higher concentrations caused cell detachment from the surface and made it impossible to count the number of cells with micronuclei. Cisplatin in the positive control samples caused an increase in the number of cells from micronuclei and promoted changes in the shape of cells and nuclei.

Conclusions. LaVO₄:Eu³⁺ nanoparticles demonstrate no genotoxicity against fibroblast cultures *in vitro*.