INTERNATIONAL RESEARCH AND PRACTICE CONFERENCE “NANOTECHNOLOGY AND NANOMATERIALS”

26-28 of August 2026

Chernivtsi, UKRAINE

Abstract book

UDK 536:669

The International research and practice conference “Nanotechnology and nanomaterials” (NANO-2026). Abstract Book of participants of the International research and practice conference, 26–28 August 2026, Chernivtsi. Edited by Dr. Olena Fesenko. – Kyiv: 2026. – P. 662.

This book contains the abstracts of contributions presented at the International research and practice conference “Nanotechnology and Nanomaterials” (NANO-2026), held on 26–28 August 2026 at Yuriy Fedkovych Chernivtsi National University, Chernivtsi, Ukraine.

The NANO-2026 Conference was organized by the Institute of Physics of NAS of Ukraine with the participation of the University of Tartu (Estonia),Yuriy Fedkovych Chernivtsi National University, University of Turin (Italy) and Pierre and Marie Curie University – Paris 6 (France).

NANO-2026 is the 14th conference in the series of NANO-conferences initiated by the Institute of Physics of NAS of Ukraine in 2012 in the framework of FP7 Nanotwining 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, India, Algeria, Indonesia and other countries. In 2021 - 2025 the Organizer Committee has received more than 800 application forms from about 25 countries of the world each years.

The NANO-2026 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; Nanooptics and photonics; Nanoplasmonics and surface enhanced spectroscopy; Nanoscale physics; Nanostructured surfaces; Physico-chemical nanomaterials science.

Website of the NANO-2026 conference: http://nano-conference.iop.kiev.ua

ISBN: 978-617-8888-05-3

Limits of substitution and regions of thermodynamic stability in the $Ca_{1-x}(Na_{0.5}Ln_{0.5})_xMoO_4$ systems (ln = rare–earth elements)

Safonov M.S.[1]***, Get'man E.I.***[1]***, Ardanova L.I.***[2]***, Radio S.V.***[1]

[1] *Vasyl' Stus Donetsk National University, Vinnytsia, 21027 Ukraine*
E-mail: m.safonov@donnu.edu.ua

[2] *Minnesota State University, Mankato, Minnesota, 56001 USA*

Scheelite-type molybdates belong to an important class of functional inorganic materials widely investigated as phosphors, laser hosts, scintillators, and optical materials. Owing to their structural flexibility, these compounds can accommodate a broad range of rare-earth and actinide ions, making them attractive both for luminescent nanomaterials and for crystalline waste forms intended for immobilization of radioactive elements. $CaMoO_4$-based solid solutions doped with alkali and rare-earth cations represent promising multifunctional materials combining tunable optical properties with high chemical and structural stability.

The present study aims to predict the substitution limits and thermodynamic stability regions of $Ca_{1-x}(Na_{0.5}Ln_{0.5})xMoO_4$ solid solutions (Ln = REEs) using the crystal-energy theory of isomorphous miscibility.

It was established that with increasing atomic number of the REE, the mixing energies Q and the critical decomposition temperatures of $Ca_{1-x}(Na_{0.5}Ln_{0.5})_xMoO_4$ solid solutions first decrease significantly in the REE series from La to Gd, and then increase in the series from Gd to Yb. The calculated results are consistent with available experimental data. Reported synthesis temperatures of related compounds fall within the predicted stability regions, while the existence of continuous solid-solution series agrees with literature data obtained by PXRD, time-resolved laser fluorescence spectroscopy (TRLFS), and interatomic-potential simulations.

The $Ca_{1-x}(Na_{0.5}Ln_{0.5})_xMoO_4$ systems exhibit broad regions of thermodynamic stability extending down to ultralow temperatures (~37 K), exceeding those reported for analogous phosphate, fluoride, and arsenate solid solutions. The obtained stability diagrams provide a useful tool for the rational design of scheelite-type functional molybdate materials with controlled composition and properties. These compounds may serve as promising crystalline matrices for the incorporation of REEs and actinide elements, as luminescent and photonic materials, and as durable waste forms for long-term immobilization of radioactive isotopes.

S