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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.

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Resource-Efficient Synthesis of Individual (Nd, Eu) and Mixed-Lanthanoid (Nd/Eu) Peacock–Weakley Polyoxotungstates

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Lanthanoid-containing polyoxometalates attract considerable attention as functional materials due to the combination of rigid polyoxotungstate frameworks and unique optical properties of rare-earth ions in heteroatom position. Peacock–Weakley-type heteropoly tungstates $[Ln(W_5O_{18})_2]^{9-}$ are promising building blocks for luminescent materials, optical sensors, hybrid photonic systems, and advanced nanocomposites.

Resource-efficient conditions for the synthesis of Nd(III)-, Eu(III)- and mixed Nd(III)/Eu(III)-containing heteropoly tungstates were developed in the $Ln(NO_3)_3$–Na_2WO_4–HNO_3–H_2O system at $Z = n(H^+)/n(WO_4^{2-}) = 0.80$ and n(Ln):n(W) = 1:10. Salting-out with acetonitrile afforded crystalline products $Na_9[Nd(W_5O_{18})_2]\cdot 35H_2O$, $Na_9[Eu(W_5O_{18})_2]\cdot 35H_2O$ and $Na_9[(Nd_{1-x}Eu_x)(W_5O_{18})_2]\cdot 35H_2O$ with yields of 87–91%. The environmental performance of the synthesis was assessed using the ComplexGAPI approach. The calculated E-factor (~0.30) indicates low waste generation and high resource efficiency of the developed synthetic methodology.

FT–IR and FT–Raman spectroscopy confirmed the formation of the Peacock–Weakley heteropoly anion. Single-crystal X-ray diffraction of $Na_9[Nd(W_5O_{18})_2]\cdot 35H_2O$ revealed that the Nd(III) ion is coordinated in a square-antiprismatic environment formed by two tetradentate lacunary $[W_5O_{18}]^{6-}$ fragments. Comparative analysis with related compounds differing in hydration degree and alkali-metal composition demonstrated remarkable structural stability of the $[Nd(W_5O_{18})_2]^{9-}$ framework, indicating that neither crystallization water content nor cationic sublattice composition significantly affects the geometry of the $[Nd(W_5O_{18})_2]^{9-}$ heteropoly anion. SEM showed that the obtained compounds consist of submicron particles with characteristic dimensions below 1000 nm and homogeneous elemental distribution, indicating phase purity and structural homogeneity of the synthesized products. The mixed-lanthanoid compound $Na_9[(Nd_{1-x}Eu_x)(W_5O_{18})_2]\cdot 35H_2O$ exhibits red luminescence under UV excitation (365 nm), demonstrating the feasibility of tuning optical properties through heteroatom engineering.

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