



The Research Leader of Fundamental Research project “Crystallochemical design and functional properties of new complex oxide compounds and hybrid nanostructures based on their” (No. 19BF037-01) is Head of Inorganic Chemistry Department, Corresponding Member of the NAS of Ukraine, Academician of Academy of Sciences of Higher School of Ukraine, D.Sc., Professor Mykola S. Slobodyanik.

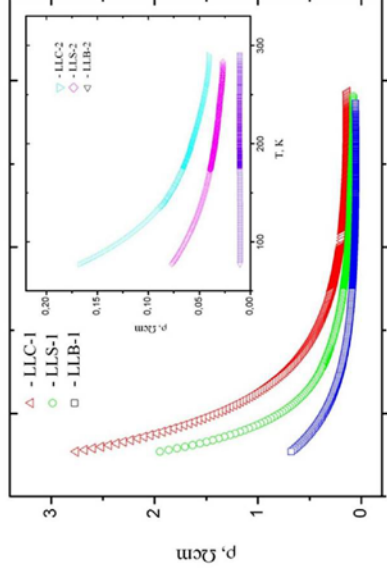
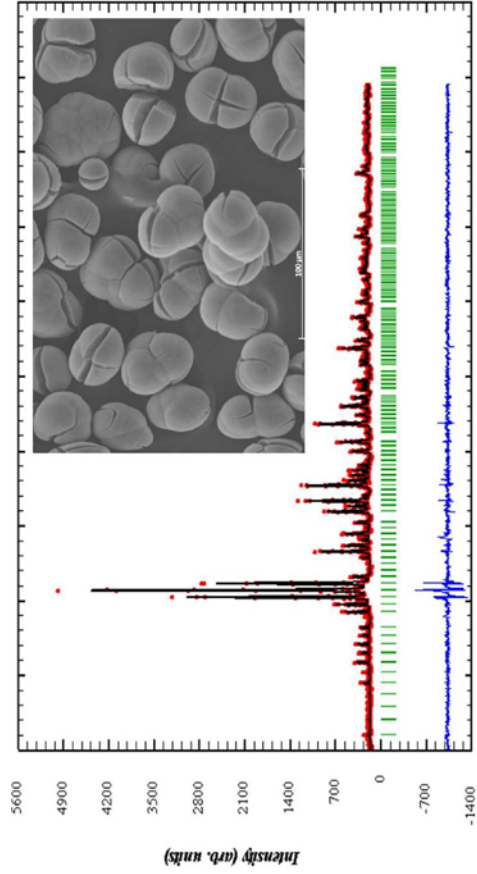
Previous and Current Research

The research is aimed at developing principles for the creation of new micro / nanostructured materials with catalytic, optical, luminescent, ion and superconducting properties, as well as new generation biocomposites for the replacement of bone tissue. The crystallochemical design of new complex oxide compounds based on different anions (phosphates, vanadates, borates, molybdates, tungstate), compounds and isomorphically substituted phases with layered perovskite-like structure is carried out and their functional properties are investigated. The development of hybrid nanostructures and compositions based on synthesized complex oxide compounds is being developed to improve their functional characteristics. The obtained fundamental research results will form the basis for the development and production of new effective micro / nanomaterials of various applications.

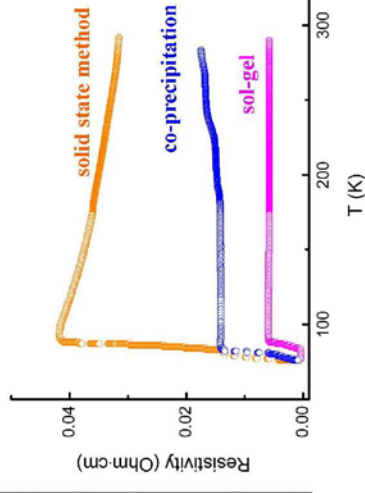
He published more than 450 original papers and review articles, 10 patents and 21 school books . He has been a supervisor of postgraduate research for Chemistry theses for 4 Doctors of Sciences and 18 Candidates of Sciences (Ph D).

Current research interests are focused on

- Synthesis and functionalization of oxide materials with non-linear optic response, high luminescence intensity (in close collaboration with physicians), bioactivity and high catalytic performance.
- Development and application of solid state matter: single crystals, ceramics, nanopowders and composites;
- Crystallization peculiarities of complex oxides,
- Crystal structure and reactivity of solids.



$Y_3Ba_5Cu_8O_{19.3}$

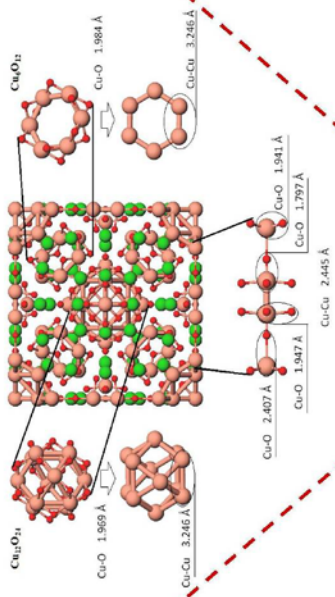


Semiconductor - metal transition for
 $LaCoO_3$: Li^+ , M^{2+} (Ca^{2+} , Sr^{2+} , Ba^{2+})

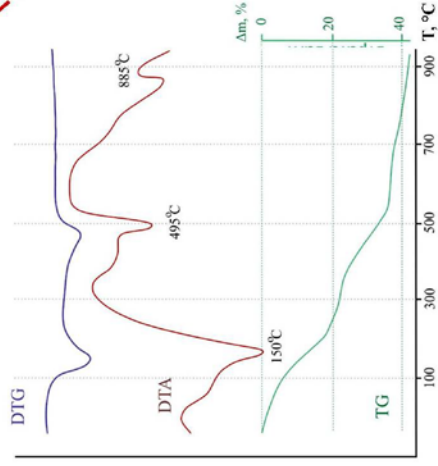
Superconducting

PROPERTIES

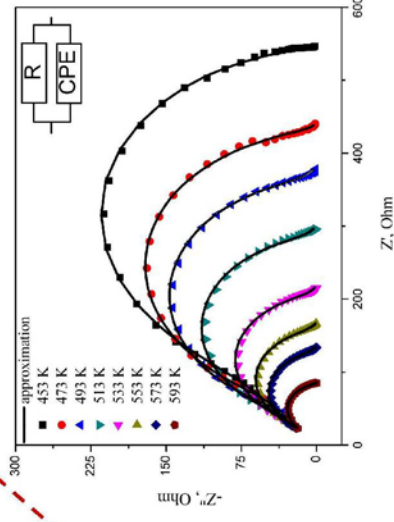
STRUCTURE



determination



DTA/TG analysis of co-precipitate carbonate for
 $La_4Ni_3O_{10}$ synthesis



Impedance spectroscopy

SYNTHESIS

Complex Oxide Compounds