

Prof. Nikolay I. LEONYUK
SHORT PROFESSIONAL INFO



EDUCATION AND DEGREES

Present post: Professor and Head of laboratory, MSU (*since 1988*)

1969: Graduated from Moscow State University (MSU)

1969-1972: Postgraduate (MSU)

1972: Ph.D. degree in Crystallography and Crystal Physics (MSU)

1985: Doctor of Science degree in Chemistry (MSU)

FIELDS

OF

R&D

Research primarily concerns crystal growth, crystallography, crystal chemistry, crystal physics of minerals and synthetic materials. Since the seventies, the main attention was paid to anhydrous borates, and several important new physical effects have been discovered from studying of these crystals. It became possible to grow borate single crystals with sufficiency large sizes and high homogeneities and to consider some of the grown crystals as polyfunctional materials for modern applications: laser and non-linear optical crystals with high efficiency, new laser media with double function and tunability, piezoelectrics and acousto-electrics, etc. Current major interests include the crystal growth and structure-property relationships in the borate systems and, also, other compounds: borosilicates, silicates, phosphates (berlinite), cuprates (high-Tc superconductors), tantalates, oxides like corundum (ruby), alexandrite, calcite, quartz, diamond. A correlation between the growth conditions, composition, structure and properties of these crystals is currently studying. Also, crystallochemical approach is developed to optimize crystal growth conditions in complex systems and to search for new minerals and their artificial analogues for science and modern applications. Publications: total - over 600, books - 4, patents - 10.

Teaching: (1) Two long-term courses of lectures on the crystal growth for students-crystallographers of the 3rd, 4th, 5th and 6th academic years at the MSU – “CRYSTAL GROWTH: Theory & Methods”(bachelor students), CRYSTAL GROWTH: Low-dimensional crystalline materials” (Master students); (2) Course of lectures and laboratory works: "Crystal Growth of Gem Stones" for students-gemmologists of the MSU.

PROFESSIONAL ACTIVITIES

1972 - 1985: Senior Scientist (MSU)

1985 - 1988: Principal Scientist and Head of laboratory (MSU)

1988 - present: Professor and Head of laboratory (MSU)

Fellowships: 1995 - International Studies & Programs, University of Wisconsin-Madison, USA; 1997 - NATO-CNR, University of Parma, Italy; 1998/1999 - Cariplo Foundation, University of Milan, Italy; 1999 - Ministry of Education of P.R.China, Shandong University, 2004 - Visiting Research Scholar Award Macquarie University Research Development Grant Scheme Round 2, Sydney, Australia; 2004China; 2004/2005 and 2009/2010 - Cariplo Foundation, Politecnico di Milano, Italy.

Honours and Memberships: Member of the IUCr, since 1976; Member of the Russian Mineralogical Society, since 1978; Soros Professor, 1997, 1998, 1999; Medal “850 Years of Moscow Foundation”, 1997; Laureate of Competition in the field of natural science “Grant of Moscow”, 2001, 2002, 2004, 2005.

Research projects since 2000: 1998-2000 – “Development of new non-linear optical solids: from the IR to the UV”, INTAS grant # 97-0515, Brussels; 1998-2000 – “Electron lattice interaction in hightemperature superconductors of the BaBiO₃ family”, INTAS grant # 97-1371, Brussels; 2000-2001 – “Development of new substrate materials for epitaxial growth of nitrides”, CLG NATO, USA; 2001 – “Development of technological basis for synthesis of minerals”, Russian Program “Integration”, grant # 211/3.2, Moscow; 2000-2002 - “Structural features of phase formation in rare earth borate and

silicate polycomponent melts”, Russian Foundation for Basic Research (RFBR), grant # 00-05-65350; 2004-2006 – “Crystallogenesi s in anhydrous borate systems”, RFBR, grant # 04-05-64709; 2005 – “Growth, comparative crystal chemistry and physical properties of cobalt doped LaMg-aluminate and YCa-oxoborate crystals”, RFBR&NSFC (National Scientific Foundation of China), RFBR grant # 04-05-39001; 2005-2007 – “Development of improved ZnO-based substrates for epitaxial growth of GaN thin films”, Arlington, USA, CRDF award # RUC2-2627-MO-04; 2005 - "Multifunctional single crystal materials based on rare earth elements", MSU Foundation, grant MNP # 15_2005; 2005 - Visiting Research Scholar Award of Macquarie University, Research Development Grant Scheme Round 2 2004, Sydney, Australia; 2005-2006 - "Creation of physico-chemical principles relating to growth technology of Yb:YAl₃(BO₃)₄ single crystals for miniature diode-pumped self-frequencydoubled components", RFBR, grant # 05-05-08021_ofi-a; 2006-2007 – “Crystallogenesi s of potassium rare earth tungstates: phase formation, crystal chemistry and crystal morphology”, RFBR&NSFC, RFBR grant # 05-05-39003; 2007-2009 – “Crystallogenesi s of rare earth borates: From functional synthetic materials to natural prototypes”, RFBR grant # 07-05-00680-a; 2008-2009 – “Definition of stability fields of neodymium aluminium borate structural modifications, crystal growth and creation of highly efficient micro-chip laser on their base”, RFBR grant # 08-026-12038_ofi-a; 2008-2009 – “Crystallo-chemical and physico-chemical preconditions for synthesis of (Er,Yb):YAl₃(BO₃)₄ single crystals and films for integrated optics of new generation”, RFBR&BRFBR (Belarus), RFBR grant # 08-025-90010_bel-a; 2012-2014 - “Micro-dimensional minerals of rare earth borates as prototypes of synthetic single crystals”, RFBR grant # 12-05-00912-a; 2012-2013 - “Synthesis, crystallochemical peculiarities, spectroscopic and laser properties of GdAl₃(BO₃)₄ crystals doped with Yb³⁺ and Er³⁺ ions”, RFBR&BRFBR, RFBR grant # 12-05-90010_bel-a; 2013-2014 – “Synthesis and investigation of high energy excitation relaxation and interaction of luminescence centers in rare earth borate crystals”, RFBR&UKR_FBR, RFBR grant # 13-05-90450_ukr-a.