

NAME

Oleksandr Romanyuk

BORN

1979

CURRENT POSITION

Head of Photoelectron Spectroscopy group

AFFILIATION

Department of Optical Materials,
FZU - Institute of Physics of the
Czech Academy of Sciences

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G-6237-2014

EDUCATION

Ph.D. - Faculty of Mathematics and Physics, Charles Univ., Prague, CR, 2001 - 2006

M.Sc. - Physics and Biomedical Electronics, Sumy State University, Ukraine, 2001

WORK EXPERIENCE

FZU – Institute of Physics, Prague, CR

2023 – present, Senior scientist, Dep. Optical Materials.

2012 – 2023, Scientist, Dep. Optical Materials.

2008 – 2012, Associated scientist/Post doc., Dep. Optical Materials.

2001 – 2006, PhD student, Dep. Optical Materials.

PDI – Paul Drude Institute, Berlin, Germany

2006 – 2008, Post doc. fellow

NAIST – Nara Institute of Science and Technology, Japan

2003 – 2004, Special research student

GRANTS

2009-2010 **Bilateral project DFG-AVCR** project No. GZ: 436 TSE 113/62/0-1 „Interface and surface structure study of heteroepitaxial AlSb(001) and InSb(001) on Si(001) grown by molecular-beam epitaxy (MBE)”, PI from the Czech side.

2010 - 2011 **Postdoctoral project GACR** P204/10/P028 „Electron energy losses at solid surfaces”, PI.

2011-2012 The Murata Science Foundation project (Japan). **International collaboration.** “Production and structure analysis of two-dimensional nano-sheet of iron silicide”. PI from the Czech side.

2012 - 2015 International **collaboration program** of the Academy of Sciences of the Czech Republic (**AVCR**). Project No. M100101201 „Applicability non-polar and semipolar GaN surfaces for bio-functionalization”. PI from the Czech side.

2015 – 2018 The international Research Experience for Students (IRES) program of National Science Foundation (**NSF, USA**). Project no. 1458427: “Wide Bandgap Materials for Energy and Biosensing Applications”. PI from the Czech side.

2018 – 2021 **Bilateral project (DFG-GACR)**, n.18-06970J, “Formation of heterovalent interfaces: A combined photoemission and ab initio DFT study of GaP/Si heterostructures”. PI.

AWARDS

2014 Travel grant, synchrotron Trieste, Italy

2013 JSPS short stay scholarship, Japan

2012 Best poster prize, ISCMP-17 conference, Varna, Bulgaria

2003 Heiwa-Nakajima Foundation scholarship, Japan

EXPERTISE AND SPECIALIZATION

Characterization of materials by photoelectron spectroscopies (XPS, UPS, AES, ARPES, HAXPES, depth profiling ArCIB-XPS), diffraction methods (LEED I-V, RHEED, XRD), electron energy loss spectroscopy (REELS). Atomic and electronic structure ab-initio DFT simulations (Abinit, WIEN2k). Focus on III-Vs semiconductor surfaces and interfaces, III-V/Si solar cells, wide-band gap semiconductors, nanoparticles, nanocrystalline diamond films, and nanopolymers for sensing applications.

SELECTED PUBLICATIONS

1. Yury V. Ryabchikov, Inam Mirza, M. Flimelová, Antonin Kana, **O. Romanyuk**, Merging of Bi-Modality of Ultrafast Laser Processing: Heating of Si/Au Nanocomposite Solutions with Controlled Chemical Content, *Nanomaterials* 14,321 (2024) 1-16.
2. M. Vrabcová, M. Spasovová, M. Houska, K. Mrkvová, N. Scott Lynn Jr., L. Fekete, **O. Romanyuk**, A. Dejneka, H. Lísalová, Long-term stability of antifouling poly(carboxybetaine acrylamide) brush coatings, *Progress in Organic Coatings* 188 (2024) 108187(1)-108187(7).
3. D. Miliaieva, A. Sokeng-Djoumessi, J. Čermák, K. Kolářová, M. Schaal, F. Otto, E. Shagieva, **O. Romanyuk**, J. Pangrác, J. Kulíček, V. Nádaždy, Š. Stehlík, A. Kromka, H. Hoppe, B. Rezek, Absolute energy levels in nanodiamonds of different origins and surface chemistries *Nanoscale Advances* 5 (2023) 4402-4414.
4. **O. Romanyuk**, A. Paszuk, I. Gordeev, R.G. Wilks, S. Ueda, C. Hartmann, R. Félix, M. Bär, C. Schlueter, A. Gloskovskii, I. Bartoš, M. Nandy, J. Houdková, P. Jiříček, W. Jaegermann, J.P. Hofmann, T. Hannappel, Combining advanced photoelectron spectroscopy approaches to analyse deeply buried GaP(As)/Si(100) interfaces: Interfacial chemical states and complete band energy diagrams *Applied Surface Science* 605 (2022) 154630(1)-154630(11).
5. **O. Romanyuk**, A. Paszuk, I. Bartoš, R.G. Wilks, M. Nandy, J. Bombsch, C. Hartmann, R. Félix, S. Ueda, I. Gordeev, J. Houdková, P. Kleinschmidt, P. Machek, M. Bär, P. Jiříček, T. Hannappel, Band Bending at Heterovalent Interfaces: Hard X-ray Photoelectron Spectroscopy of GaP/Si(001) Heterostructures, *Applied Surface Science* 565 (2021) 150514-1-150514-13.
6. **O. Romanyuk**, I. Gordeev, A. Paszuk, O. Supplie, J.P. Stoeckmann, J. Houdková, E. Ukraintsev, I. Bartoš, P. Jiříček, T. Hannappel GaP/Si(001) interface study by XPS in combination with Ar gas cluster ion beam sputtering *Applied Surface Science* 514 (2020) 145903(1)-145903(8).
7. S. Tulić, T. Waitz, M. Čaplovičová, G. Habler, M. Varga, M. Kotlár, V. Vretenár, **O. Romanyuk**, A. Kromka, B. Rezek, V. Skákalová Covalent Diamond–Graphite Bonding: Mechanism of Catalytic Transformation, *ACS Nano* 13 (2019) 4621-4630.
8. **O. Romanyuk**, T. Hannappel, F. Grosse, Atomic and electronic structure of GaP/Si(111), GaP/Si(110), and GaP/Si(113) interfaces and superlattices studied by density functional theory. *Physical Review B* 88 (2013) 115312-1-115312-8
9. **O. Romanyuk**, P. Jiříček, T. Paskova, I. Bieloshapka, I. Bartoš, GaN polarity determination by photoelectron diffraction, *Applied Physics Letters* 103 (2013) 091601-1-091601-4.
10. S. Hajati, **O. Romanyuk**, J. Zemek, S. Tougaard, Validity of Yubero-Tougaard theory to quantitatively determine the dielectric properties of surface nanofilms, *Physical Review B* 77 (2008) 155403(1)-155403(11).
11. **O. Romanyuk**, V. M. Kaganer, R. Shayduk, B. P. Tinkham, W. Braun, Staircase model of GaSb(001) (1x3) and c(2x6) phases *Physical Review B* 77 (2008) 235322(1)-235322(5).