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RESEARCH EXPERIENCE

- 2008 – present **Research associate**, National Research Council of Canada, Ottawa, ON
Quantum Theory Group (with Prof. P. Hawrylak)
- Multi-exciton generation in nanocrystals for use in solar cells
 - Optical properties and excitonic finestructure of epitaxial and colloidal nanostructures
 - Excitons and biexcitons coupling, dephasing, lifetimes and carrier multiplication (density matrix, tight binding, configuration interaction)
 - Microscopic dielectric screening (ab initio)
 - Effect of surface ligands on electronic properties of nanocrystals; crystal growth, surface traps (ab initio)
 - Graphene quantum dots
 - Magnetization and degenerate electronic edge states; effect of dot shape, edge passivation and reconstructions (ab initio)
- 2005 – 2008 **Postdoctoral fellow**, University of Sherbrooke, QC, Canada
Quantum Semiconductors and Laser Nanotechnology Group
(with Prof. J.J.Dubowski)
- Functionalization of semiconductor surfaces for bio-detection
 - Formation and structure of self-assembled monolayers of thiols on GaAs and Au (molecular mechanics and ab initio simulations)
 - Electronic passivating properties of thiols on GaAs (ab initio)
 - Analysis and simulation of XPS, IRS, STM and surface XRD data
 - Laser-assisted quantum well intermixing for applications in photonics
 - Light absorption, heat propagation, defects diffusion and electronic energy states in quantum wells (finite element method modeling)

EDUCATION

- 2001 – 2004 **Ph. D.** in Physics of semiconductors and dielectrics
Chernivtsi National University, Ukraine (Advisor: Prof. V. Deibuk)
- Thesis: Chemical bonding, electronic and optical properties of group-III nitride alloys (empirical pseudopotential method calculations).
- 2000 – 2001 **M. Sc.** in Semiconductor microelectronics (diploma with honors)
1996 – 2000 **B. Sc.** in Semiconductor microelectronics (diploma with honors)
Chernivtsi National University, Ukraine

RESEARCH INTERESTS

Computational aspects of physical chemistry, surface science and nanotechnology.

Electronic and optical properties of nanostructures: semi-empirical atomistic methods, many-body problems, multi-exciton generation and Auger processes, controlling Coulomb scattering using size/shape/structure of the nanocrystals.

Passivation of semiconductor surfaces and nanocrystals: effect of surface ligands and surface reconstructions on electronic properties, nucleation and growth kinetics of nanocrystals, ultra-stable (magic size) nanoparticles, surface traps, blinking of colloidal quantum dots.

Self-assembled monolayers: structural properties of SAMs on metal and semiconductor surfaces, formation kinetics, directed self-assembly.

TEACHING EXPERIENCE

- 2005-2007 M. Sc. course "Basic principles and applications of lasers": *Finite Element Method modeling of laser light and heat propagation in semiconductors*.
Department of Electrical and Information Engineering, University of Sherbrooke, Canada
- 2002, 2003 M. Sc. course "*Theory of electrical and electronic circuits*", Department of semiconductor microelectronics, Chernivtsi National University, Ukraine

SERVICE

Reviewer for JACS, J. Phys. Chem., Langmuir, PCCP, Chem. Comm., J. Mater. Chem., J. Nanomaterials, J. Laser Micro/Nanoengineering.

AFFILIATIONS

American Physical Society, Materials Research Society

REFERENCES**Prof. Pawel Hawrylak**

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Canada research chair in Quantum Semiconductors
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Dr. Peter Maksymovych

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PUBLICATIONS

- M. Korkusinski, **O. Voznyy**, P. Hawrylak,
Theory of highly excited semiconductor nanostructures including Auger coupling: exciton-biexciton mixing in CdSe nanocrystals,
Phys.Rev.B, submitted.
- **O. Voznyy**,
Mobile surface traps in CdSe nanocrystals with carboxylic acid ligands,
J.Phys.Chem.C, submitted.
- P. Potasz, D. Guclu, **O. Voznyy**, J.A. Folk, P. Hawrylak,
Electronic and magnetic properties of triangular graphene quantum rings,
Phys. Rev. B, 83, **2011**, 174441.
- **O. Voznyy**, D. Guclu, P. Potasz, P. Hawrylak,
Effect of edge reconstruction and passivation on zero-energy states and magnetism in triangular graphene quantum dots with zigzag edges,
Phys. Rev. B, 83, **2011**, 165417.
- M. Korkusinski, **O. Voznyy**, P. Hawrylak,
Fine structure and size dependence of exciton and biexciton optical spectra in CdSe nanocrystals,
Phys. Rev. B, 82, **2010**, 245304.
- P. Maksymovych, **O. Voznyy**, D. Dougherty, D. Sorescu, J. T. Yates Jr.
Gold adatom as a key structural component in self-assembled monolayers of organosulfur molecules on Au(111),
Prog. Surf. Sci., **2010**, 85, pp.206-240.
- J. J. Dubowski, **O. Voznyy**, G. Marshall,
Molecular self-assembly and passivation of GaAs (001) with alkanethiol monolayers: a view towards bio-functionalization,
Appl. Surf. Sci., **2010**, 256, p.5714.
- D. Guclu, P. Potasz, **O. Voznyy**, M. Korkusinski, P. Hawrylak,
Magnetism and correlations in fractionally filled degenerate shells of graphene quantum dots,
Phys. Rev. Lett, **2009**, 103, 246805.
- R. Wang, C. I. Ratcliffe, X. Wu, **O. Voznyy**, Ye Tao, K.Yu,
Magic-sized Cd₃P₂ II–V nanoparticles exhibiting bandgap photoemission,
J. Phys. Chem. C, **2009**, 113, p.17979.
- **O. Voznyy**, J. J. Dubowski, J. T. Yates Jr., P. Maksymovych,
The role of gold adatoms and stereochemistry in self-assembly of methylthiolate on Au(111),
J. Am. Chem. Soc., **2009**, 131, p.12989.
- **O. Voznyy**, J. J. Dubowski,
c(4 x 2) structures of alkanethiol monolayers on Au (111) compatible with the constraint of dense packing,
Langmuir, **2009**, 25, p.7353.

- **O. Voznyy**, J. J. Dubowski,
Structure of thiol self-assembled monolayers commensurate with the GaAs (001) surface,
Langmuir, **2008**, 24, p.13299.
- **O. Voznyy**, J. J. Dubowski,
Adsorption kinetics of hydrogen sulfide and thiols on GaAs (001) surfaces in a vacuum,
J. Phys. Chem. C, **2008**, 112, p.3726.
- **O. Voznyy**, J. J. Dubowski,
Structure, bonding nature, and binding energy of alkanethiolate on As-rich GaAs (001) surface: a density functional theory study,
J. Phys. Chem. B, **2006**, 110, p.23619.
- **O. Voznyy**, R. Stanowski, J. J. Dubowski,
Multibandgap quantum well wafers by IR laser quantum well intermixing: simulation of the lateral resolution of the process,
Journal of Laser Micro / Nanoengineering, **2006**, 1, p.48.
- R. Stanowski, **O. Voznyy**, J. J. Dubowski,
Finite element model calculations of temperature profiles in Nd:YAG laser annealed GaAs/AlGaAs quantum well microstructures,
Journal of Laser Micro / Nanoengineering, **2006**, 1, p.17.
- V. Deibuk, **O. Voznyy**,
Thermodynamic stability and charge redistribution in ternary AlGa_N, InGa_N, and InAlN alloys,
Semiconductors, **2005**, 39, p.623.
- **O. Voznyy**, V. Deibuk,
The role of alloying effects in the formation of electronic structure of unordered group III nitride solid solutions,
Semiconductors, **2004**, 38, p.304.
- V. Deibuk, **O. Voznyy**, M. M. Sletov,
Features of optical properties of aluminum gallium nitride solid solutions,
Semiconductors, **2002**, 36, p.398.
- V. Deibuk, **O. Voznyy**, M. M. Sletov,
Band structure and spatial charge distribution in AlGa_N,
Semiconductors, **2000**, 34, p.35.

CONFERENCE PRESENTATIONS

- M. Korkusinski, M. Zielinski, E. Kadantsev, **O. Voznyy**, P. Hawrylak,
QNANO: computational platform for semiconductor nanostructures,
CECAM 2010, Manchester, UK, June **2010**.
- **O. Voznyy**, M. Korkusinski, E. Kadantsev, P. Hawrylak,
Atomistic calculations of the biexciton finestructure in CdSe nanocrystals (oral),
APS March Meeting, Portland, OR, March **2010**.
- D. Guclu, P. Potasz, **O. Voznyy**, M. Korkusinski, P. Hawrylak,
Magnetism and Correlations of Fractionally Filled Zero-energy States in Graphene QDots,
APS March Meeting, Portland, OR, March **2010**.

- **O. Voznyy**, E. Kadantsev, M. Korkusinski, P. Hawrylak,
Effect of surface ligands on the electronic and optical properties of CdSe nanocrystals (oral),
MRS Fall Meeting, Boston, MA, November **2009**.
- **O. Voznyy**, E. Kadantsev, M. Korkusinski, P. Hawrylak,
Influence of dephasing time and density of states asymmetries on carrier multiplication efficiencies
(poster),
Gordon Research Conference on Nanocrystals & Nanostructures, South Hadley, MA, July **2009**.
- D. Guclu, P. Potasz, **O. Voznyy**, M. Korkusinski, P. Hawrylak,
Magnetism and correlations of fractionally filled zero-energy states in triangular graphene quantum
dots,
18th Conference on Electronic Properties of Two-Dimensional Systems, Kobe, Japan, July **2009**.
- **O. Voznyy**, J.J. Dubowski,
Reconstructions of the Au(111) and GaAs(001) surfaces driven by thiol-thiol interactions (oral),
Canadian Association of Physicists Congress, Quebec, QC, June **2008**.
- **O. Voznyy**, J.J. Dubowski,
Structure and adsorption mechanisms of thiol self-assembled monolayers on GaAs (001) surfaces
(oral),
APS March Meeting, New Orleans, LA, March **2008**.
- **O. Voznyy**, J. J. Dubowski,
Thiols Self-Assembled Monolayers on GaAs (001): Better Order on Imperfect Surfaces (poster),
13th Canadian Semiconductor Technology Conference, Montreal, Canada, August **2007**.
- **O. Voznyy**, J.J. Dubowski,
First-principles study of adsorption energetics of alkanethiols on GaAs(001) (poster),
MRS Fall Meeting, Boston, MA, November **2006**.
- **O. Voznyy**, J.J. Dubowski,
Adsorption and self-assembly of alkanethiols on GaAs (001) surface (oral),
IEEE Lasers & Electro-Optics Society Annual Meeting, Montreal, October **2006**.
- **O. Voznyy**, J.J. Dubowski,
Ab-initio study of self-assembled monolayers of thiols on (001) GaAs (oral),
Photonics North, Quebec City, Canada, June **2006**.
- **O. Voznyy**, R. Stanowski, J. J. Dubowski,
Multibandgap quantum well wafers by IR laser quantum well intermixing: simulation of the lateral
resolution of the process (oral),
Laser Precision Microfabrication, Williamsburg, VA, April **2005**.
- R. Stanowski, **O. Voznyy**, J. J. Dubowski,
Modeling of temperature profiles in Nd:YAG laser annealed GaAs/AlGaAs quantum well
microstructures (oral),
Photonics West, San Jose, January **2005**.
- L. Ostrovskaya, A. Vasin, **O. Voznyy**, V. Deibuk, M. Sletov.
Study of the wettability of III-N thin films with different bond ionicity and surface layers polarity
(poster),
E-MRS Fall meeting, Warsaw, Poland, **2005**.

- **O. Voznyy**, V. Deibuk,
Optical properties of ordered group-III nitride alloys (poster),
E-MRS Fall Meeting, Symposium N, Warsaw, Poland, **2003**.
- **O. Voznyy**, V. Deibuk,
Thermodynamic stability of bulk and film group-III nitride alloys (oral),
XV International workshop "*Physics and technology of thin films*", Ivano-Frankivsk, Ukraine, **2003**.
- V. Deibuk, **O. Voznyy**, M. Sletov,
Effect of antisites on electronic band structure and charge densities of $\text{Ga}_{1-x}\text{Al}_x\text{N}$ (poster),
XXVIII International School on *Physics of Semiconducting Compounds*, Jaszowiec, Poland, **1999**.