Oleksandr Savchuk

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Personal data

Date of birth: 13.01.1988

Nationality: Ukrainian

Academic qualifications

2011 – 13/05/2016	PhD student, Department of Physical and Inorganic Chemistry (Rovira i Virgili University, Tarragona, Spain). Contacts of Supervisors: Prof. Dr. Francesc Diaz: f.diaz@urv.cat Dr. Joan Josep Carvajal: joanjosep.carvajal@urv.cat
2009 – 2010	Master in Physics. Specialization: Physics of Semiconductors and Nanostructures (Chernivtsi National University, Chernivtsi, Ukraine).
2005 – 2009	Bachelor degree in Physics (Chernivtsi National University, Chernivtsi, Ukraine).

Research activities:

- Synthesis of semiconductor nanostructures by laser techniques.
- Synthesis of lanthanide doped nanoparticles by sol-gel and hydrothermal methods.
- Characterization of crystalline materials by Confocal, Scanning Electron, Environmental Scanning Electron, and Transmission Electron Microscopies.
- Fabrication of periodic structures by photolithography systems.
- Optical spectroscopy of bulk crystals, nanoparticles and nanostructures.

Fellowships:

- Scientific contribution in the frame of SPARC project. EU commission in the Sixth framework program. Contract №011935. INFN, University of Salento, Physics Department, Lecce, Italy. 2011.
- Predoctoral fellowship, Department of Physical and Inorganic Chemistry Grant (1321 U07 E30 N-2011Invact/Diaz, F) 2011-2012.
- Predoctoral competitive fellowship of the Catalan Government FI (2013-2016).
- COST Short Term Scientific Mission. COST action: CM1403. Period: 30.03.2015 – 28.06.2015. Reference number: COST-STSM-CM1403-25370.

Prizes and awards:

- Graduation with honors from Chernivtsi National University: Bachelor's Diploma.
- Graduation with honors from Chernivtsi National University University: Master of Physics.
- Special award for Doctorate program in Science and Chemical Technology from Rovira i Virgili University.

Research experience:

- **(10/2016 – 01/2017).** Research fellow. University Rovira i Virgili, Tarragona, Spain, Department of Physical and Inorganic Chemistry. Novel luminescent thermometer-heater based on carbon nanoparticles.
- **(2011 – 2016).** PhD student. University Rovira i Virgili, Tarragona, Spain, Department of Physical and Inorganic Chemistry. Development of new materials and techniques for luminescence nanothermometry.
- **(2015 – 3 months).** Mobility program. University of Aveiro, Department of Physics, Aveiro, Portugal. (2015 – 3 months). Enhancement of up-conversion emissions in lanthanide-doped nanoparticles coupled to metallic plasmons and their influence on temperature sensing applications.
- **(2013 – 2 weeks, 2015 – 2 weeks).** Scientific visit. University Autonoma de Madrid, Department of Physics of Materials, Madrid, Spain. Temperature measurements in biological tissues using upconversion nanoparticles.

- **(2011 - 1 month).** INFN, University of Salento, Department of Physics, Lecce, Italy. Synthesis of ZnO nanoparticles by laser ablation technique in liquid media.

Patents:

1. Ol. A. Savchuk; J. J. Carvajal; J. Massons; M. Aguiló; F. Díaz. ¨Dispositivo y metodo para medida remota de temperatura¨ ES 2558733 A1**.**

List of publications:

- *Articles:*

1. **Ol. A. Savchuk**; J. J. Carvajal; J. Massons; M. Aguiló; F. Díaz. Determination of photothermal conversion efficiency of graphene and graphene oxide through an integrating sphere method *Carbon* **2016**, 103, 134.
2. **Ol. A. Savchuk**; J. J. Carvajal; C. Cascales; M. Aguiló; F. Díaz. Benefits of silica core-shell structures on the temperature sensing properties of Er,Yb:$GdVO_4$ up-conversion nanoparticles. *ACS Appl. Mater. Interfaces* **2016**, 8, 7266.
3. **Ol. A. Savchuk**; J. J. Carvajal; M. C. Pujol; J. Massons; P. Haro-Gonzalez; O. Martinez; J. Jimenez; M. Aguilo; F. Diaz. New strategies involving upconverting nanoparticles for determining moderate temperatures by luminescence thermometry. *J Lumin* **2016**,169, 711.
4. **Ol. A**. **Savchuk**; J. J. Carvajal; J. Massons; C. Cascales; M. Aguiló; F. Díaz. A novel low-cost, compact and fast signal processing sensor for ratiometric luminescent nanothermometry. *Sensors and Actuators A* **2016**, 250, 87.
5. **Ol. A**. **Savchuk**; J. J. Carvajal; Y. Cesteros; P. Salagre; H. D. Nguyen; A. Rodenas; J. Massons; M. Aguiló; F. Díaz. Microwave-assisted solvothermal synthesis of Er,Yb:$NaYF_4$ nanoparticles for luminescent thermometric applications **(2016)** Submitted to Chemistry of Materials.
6. **Ol. A. Savchuk**; J. J. Carvajal; C. Cascales; J. Massons; M. Aguiló; F. Díaz. Thermochromic upconversion nanoparticles for visual temperature sensors with high thermal, spatial and temporal resolution **(2016)** *J. Mater. Chem. C,* 4, 6602.

7. **Ol. A. Savchuk**; J. J. Carvajal; C. Cascales; P. Haro-González; M. Aguiló; and F. Díaz. NIR-to-NIR upconversion emissions of Tm^{3+},Yb^{3+}:$GdVO_4$@SiO_2 core-shell nanoparticles for temperature sensing purposes and imaging in the first biological window **(2016)** Submitted to Advanced Functional Materials.
8. **Ol. A. Savchuk**; J. J. Carvajal; L.G. De la Cruz; P. Haro-González; M. Aguiló; F. Díaz. Luminescence thermometry and imaging in the second biological window at high penetration depth with Nd:$KGd(WO_4)_2$ nanoparticles **(2016)** *J. Mater. Chem. C*, 4, 7397.
9. **Ol. A. Savchuk**; J. J. Carvajal; P. Haro-González; M. Aguiló; F. Díaz. Luminescent nanothermometry using short-wavelength infrared light **(2016)** Submitted to Chem. Phys. Phys. Chem.
10. **Ol. A. Savchuk**; J. J. Carvajal; C. D. S. Brites; L. D. Carlos; M. Aguiló; and F. Díaz. Multifunctional Ho,Tm:KLuW nanoparticles for temperature sensing applications **(2016)** Submitted to Nanoscale.
11. **Oleksandr A. Savchuk**; Joan J. Carvajal; M. Cinta Pujol; E. William Barrera; Jaume Massons; Magdalena Aguilo; and Francesc Diaz. Ho,Yb:$KLu(WO_4)_2$ nanoparticle a versatile material for multiple thermal sensing purposes by luminescent thermometry. *J. Phys. Chem. C* **2015**, 119, 18546.
12. **Ol. A. Savchuk**, P. Haro-Gonzalez, J.J. Carvajal, D. Jaque, J. Massons, M. Aguilo, F. Diaz, Er:Yb:NaY_2F_5O up-converting nanoparticles for sub-tissue fluorescence lifetime thermal sensing, *Nanoscale*, **2014**, 6, 9727.
13. **Ol. A. Savchuk**, J. J. Carvajal, M.C. Pujol, J. Massons, P. Haro-González, D. Jaque, M. Aguiló and F. Díaz, New strategies for luminescence thermometry in the biological range using upconverting nanoparticles, *Proc. of SPIE*, **2014**, 9129, 91292E.
14. **Ol. A. Savchuk**; J. J. Carvajal; E. W. Barrera; M. C. Pujol; X. Mateos; R. Solé; J. Massons; M. Aguiló; F. Díaz, (Ho, Tm, Yb): KLuW nanoparticles, an efficient thermometer sensor in the biological range, *Proc. of SPIE*, **2013**, 8594, 859406.
15. A. I. Savchuk, V. I. Fediv, S. A. Ivanchak, V. V. Makoviy, M. M. Smolinsky, **O. A. Savchuk**, A. Perrone and L. Cultera, Formation and transformation of II-VI semiconductor nanoparticles by laser radiation, *J. Optoelectron. Adv. Mat.*, **2010**, 12, 3, 564.

16. A.I. Savchuk, A. Perrone, A. Lorusso, I.D. Stolyarchuk, **O. A. Savchuk**, O.A. Shporta, ZnMnO diluted magnetic semiconductor nanoparticles: Synthesis by laser ablation in liquids, optical and magneto-optical properties, *Appl. Surf. Sci*., **2014**, 302, 205.

- *Conference abstracts:*

Invited talks

1. J. J. Carvajal, G. Raj Kumar, **Ol. A. Savchuk**, E. W. Barrera, C. Mateos, M. C. Pujol, X. Mateos, M. O. Ramirez, L. T. Bausa, M. Aguilo, F. Diaz, Upconverting nanaparticles: a multiplatform for photonics applications, VII eme Rencontre Franco-espagnole sur la Chimie et la Physique del'etat Solide, Paris (France), June 2012.
2. J. J. Carvajal, **Ol. A. Savchuk,** M. Aguilo, F. Diaz. Upconverting nanoparticles: new nanothermometers for the biological range of temperatures, Workshop Biosensors for a better environment, Caldes de Montbui (Spain), September 2013.

Oral communications

1. **Ol. A. Savchuk**, J. J. Carvajal, M.C. Pujol, J. Massons, P. Haro-González, D. Jaque, M. Aguiló, F. Díaz, Luminescence nanothermometry in the biological range using upconverting nanoparticles: New strategies, 17th International Conference on Luminescence and Optical Spectroscopy of Condensed Matter (ICL 2014), 13 - 18 July 2014, Wroclaw, Poland.
2. **Ol. A. Savchuk**, J.J. Carvajal, M.C. Pujol, J. Massons, P. Haro-González, D. Jaque, M. Aguiló, F. Díaz, New strategies for luminescence thermometry in the biological range using upconverting nanoparticles, SPIE Photonics Europe 2014, Brussels (Belgium), April 2014.
3. **Ol. A. Savchuk**, J.J. Carvajal, E.W. Barrera, M.C. Pujol, X. Mateos, L. Mateos, M. Ramírez, L.E. Bausá, R. Solé, J. Massons, M. Aguiló, F. Díaz, $(Ho^{3+},Yb^{3+},Tm^{3+}):KLu(WO_4)_2$ nanoparticles, an efficient thermometry sensor in the biological range, 2013 Photonics West, San Francisco, California (USA), February 2013.

4. **Oleksandr Savchuk**, Graphene oxide coated luminescent nanoparticles for photothermal therapy, CEIS Nobel Campus “Chemistry for life”, 1-4 July 2012, Port Aventura, Spain (Oral).

Poster communications

5. **Ol. A. Savchuk**, J. J. Carvajal, Raj Kumar Golconda, M. C. Pujol, X. Mateos, R. Solé, J. Massons, M. Aguiló and F. Díaz, Up-conversion based nanophosphor display on nonlinear substrate, 5-th Mediterranean conference on Nanophotonics MediNano, 5-6 November 2012, Barcelona, Spain.
6. **Oleksandr A. Savchuk**, Joan J. Carvajal, Maria CintaPujol, Magdalena Aguiló, FrancescDíaz, Graphene oxide coated luminescent nanoparticles for photothermal therapy, Workshop Biosensors for a better environment, 7 September 2013, Caldes de Montbui (Spain).
7. **Ol. A. Savchuk**, P. Haro-González, J.J. Carvajal, D. Jaque, J. Massons, M. Aguiló, and F. Díaz, Er, Yb:NaY_2F_5O up-conversion nanoparticles: a new tool for lifetime thermometry in the biological range, 8EFE Encuentro Franco-Español de Química y Física de Estado Sólido 2-6 April, 2014, Vila-Real, Spain.
8. **Ol. A. Savchuk**, J. J. Carvajal, V. Jambunathan, E. W. Barrera, M. C. Pujol, X. Mateos, M. Aguilo, F Diaz, Temperature dependent photoluminescence of triply doped (Ho, Tm, Yb):$KLu(WO_4)_2$ single crystal, COST Action CM1006 “European f-Element Chemistry”, 2-4 April 2012, Tarragona, Spain.
9. V.I. Fediv, A.I. Savchuk, V.M. Frasunyak, V.V. Makoviy and **O. A. Savchuk**, Magnetic and magneto-optical properties of CdS:Mn quantum dots in PVA matrix, Abstract book of the Conference “Quantum Dot 2010”, 26-30 April 2010, Nottingham, United Kingdom, p. 413.
10. A.I. Savchuk., I.D. Stolyarchuk, V.V. Makoviy and **O. A. Savchuk**, Growth of one-dimensional structures based on layered semiconductors, E-MRS 2010 Spring Meeting, Strasbourg, France, June 7 - 11, 2010, p. 15.
11. A.I. Savchuk, V.I. Fediv, S.A. Ivanchak, V.V. Makoviy, M.M. Smolinsky, **O. A. Savchuk**, A. Perrone and L. Cultrera, Formation and transformation of II-VI semiconductor nanoparticles by laser radiation. E-MRS 2009 Spring Meeting, Strasbourg, France, June 8 -12, 2009, p. 7.

12. G. I. Kleto, A.I. Savchuk., P. N. Tkachuk, V. I. Tkachuk,V. Z. Tsaly and **O. A. Savchuk**, Photoelectrical properties of SnO_2/ZnO/CoO:Ni heterostructure. E-MRS 2009 Spring Meeting, Strasbourg, France, June 8 - 12, 2009, p 13.