Maria R. Lukatskaya

Ph.D. Candidate & Research Assistant

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ACADEMIC RECORD AND EDUCATION

- September 2011-Present: **PhD Student**, Department of Material Science and Engineering, Drexel University, Philadelphia, PA, USA
  Advisor: Prof. Yury Gogotsi
  GPA: 3.91/4.00
- September 2009-July 2011: **Master of Chemistry**, Department of Materials Science, Lomonosov Moscow State University, Russia
  Major: ***Solid State Chemistry***
  Grade: ***Distinction with Honors Degree***
  MSc Thesis Title: "Electrochemical formation and transport properties of 1D metallic nanostructures"
- September 2005-July 2009: **Bachelor of Materials Science**, Department of Materials Science, Lomonosov Moscow State University, Russia
  Major: ***Chemistry, Physics and Mechanics of Materials***
  Grade: ***Distinction with Honors Degree***
  Graduation Project: "Synthesis and investigation of the $SrFe_{12}O_{19}$ anisotropic nanostructures in the porous alumina films"

PUBLICATIONS

First-authored publications in reversed chronological order

1. M.R. Lukatskaya, J. Halim, B. Dyatkin, M. Naguib, Y.S. Buranova, M.W. Barsoum, Y.Gogotsi, *Room-Temperature Carbide-Derived Carbon Synthesis by Electrochemical Etching of MAX Phases*// **Angewandte Chemie**, 2014, 53 (19), pp.4877-4880, ***Cover article*** [IF= 13.734]
2. M. R. Lukatskaya, O. Mashtalir, C.E. Ren, Y. Dall'Agnese, P. Rozier, P. L. Taberna, M. Naguib, P. Simon, M.W. Barsoum, Y. Gogotsi, *Cation Intercalation and High Volumetric Capacitance of Two- dimensional Titanium Carbide*// **Science**, 2013, 341 (6153), pp. 1502-1505 [IF= 31.477]
3. M. R. Lukatskaya, Y. Gogotsi, *Three-dimensional nanostructures from porous anodic alumina*// **MRS Communications**, 2012, 2 (2), pp. 51-54 [IF= 1.553]
4. M.R. Lukatskaya, L.A. Trusov, A.A. Eliseev, A.V. Lukashin, M. Jansen, P.E. Kazin, K.S. Napolskii, *Controlled way to prepare quasi-1D nanostructures with complex chemical*

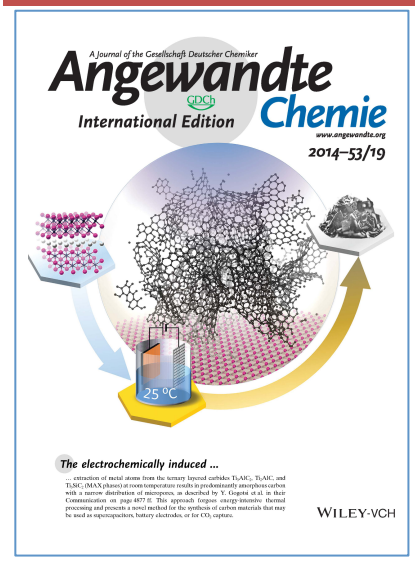
composition in porous anodic alumina// **Chemical Communications**, 2011, 47 (8), pp. 2396–2398 [IF= 6.718]

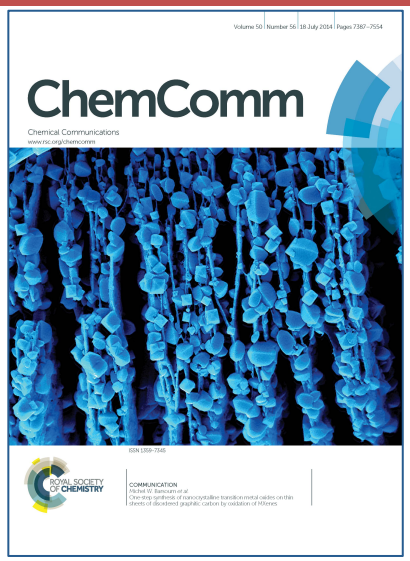
5. M.R. Lukatskaya, A.S. Vyacheslavov, A.V.Lukashin, Yu.D Tretyakov, O.M.Zhigalina, A.A.Eliseev, *Cobalt-containing nanocomposites based on zeolites of MFI framework type*// **Journal of Magnetism and Magnetic Materials,** 2009, 321 (23), pp. 3866–3869 [IF= 2.002]

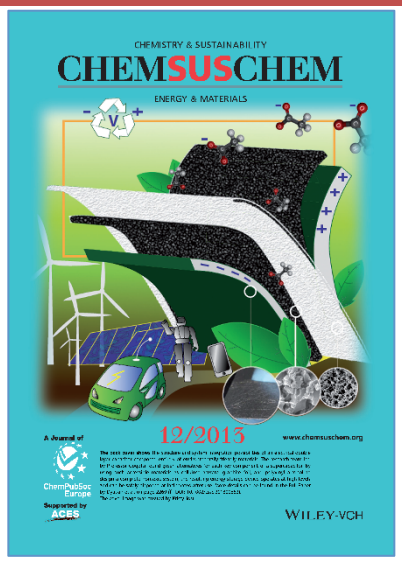
Co-authored publications in reversed chronological order

6. M. D. Levi, M. R. Lukatskaya, S. Sigalov, M. Beidaghi, N. Shpigel, L. Daikhin, D. Aurbach, M. W. Barsoum, Y. Gogotsi, Solving the Capacitive Paradox of 2D MXene by Electrochemical Quartz-Crystal Admittance and in situ Electronic Conductance Measurements// **Advanced Energy Materials**, DOI: 10.1002/aenm.201400815 [IF= 14.385]
7. H. Ghassemi, W. Harlow, O. Mashtalir, M. Beidaghi, M. R. Lukatskaya, Y. Gogotsi, and M. L. Taheri, In Situ Environmental Transmission Electron Microscopy Study of Oxidation of Two-Dimensional Ti_3C_2 and Formation of Carbon-Supported TiO_2// **Journal of Materials Chemistry A**, *accepted publication* [IF= 6.101]
8. J. Halim, M.R. Lukatskaya, K.M. Cook, J. Lu, C.R. Smith, L.A. Laslund, S.J. May, L. Hultman, Y.Gogotsi, P. Eklund, M.W. Barsoum, *Transparent Conductive Two-Dimensional Titanium Carbide Epitaxial Thin Films*// **Chemistry of Materials**, 2014, 26 (7), pp. 2374–2381 [IF= 8.535]
9. M. Naguib, O. Mashtalir, M. R. Lukatskaya, B. Dyatkin, C. Zhang, V. Presser, Y. Gogotsi, M. W. Barsoum, *One-Step Synthesis of Nanocrystalline Transition Metal Oxide on Thin Sheets of Disordered Graphitic Carbon by Oxidation of MXene*// **Chemical Communications**, 2014, DOI: 10.1039/C4CC01646G, ***Cover article*** [IF= 6.718]
10. B Dyatkin, V Presser, M Heon, M.R. Lukatskaya, M Beidaghi, Y Gogotsi, *Development of a Green Supercapacitor Composed Entirely of Environmentally Friendly Materials //* **ChemSusChem**, 2013, 6 (12), pp. 2269-2280, ***Cover article*** [IF= 7.117]
11. M.V. Kharlamova, V.N. Mochalin, M.R. Lukatskaya, J. Niu, V. Presser, S. Mikhalovsky, Y. Gogotsi, *Adsorption of Proteins in Channels of Carbon Nanotubes: Effect of Surface Chemistry//* **Materials Express,** 2013, 3 (1), pp.1-10 [IF= 1.720]
12. R. Singhal, V. Mochalin, M.R. Lukatskaya, G. Friedman, Y. Gogotsi, *Separation and Liquid Chromatography Using a Single Carbon Nanotube*// **Scientific Reports**, 2012, 2, doi:10.1038/srep00510 [IF= 5.078]

JOURNAL COVERS







CONFERENCE PRESENTATIONS AND POSTERS

1. M.R. Lukatskaya, C.E. Ren, O. Mashtalir, Y. Dall'Agnese, M. Naguib, P. Simon, M.W. Barsoum, Y. Gogotsi, *Cation Intercalation and High Volumetric Capacitance of Two-Dimensional Titanium Carbide*// MRS 2014, San Francisco, USA (poster)
2. J. Halim, M.R. Lukatskaya, K.M. Cook, J. Lu, C.R. Smith, L.A. Laslund, S.J. May, L. Hultman, Y.Gogotsi, P. Eklund, M.W. Barsoum *Optical and Electronic Properties of Two-Dimensional Ti_3C_2 Epitaxial Thin Films*// MRS 2014, San Francisco, USA (poster)
3. M.R. Lukatskaya, C.E. Ren, O. Mashtalir, Y. Dall'Agnese, M. Naguib, P. Simon, M.W. Barsoum, Y. Gogotsi, *Ion Intercalation into 2D Titanium Carbide Based MXenes: Applications for Electrochemical Energy Storage*// MRS 2014, San Francisco, USA (invited talk)
4. M.R. Lukatskaya, C.E. Ren, O. Mashtalir, Y. Dall'Agnese, M. Naguib, P. Simon, M.W. Barsoum, Y. Gogotsi, *Capacitive Performance of Titanium Carbide Based MXenes*// EESAT 2013, San Diego, USA (oral, 20 min talk)
5. M.R. Lukatskaya, C.E. Ren, Y. Dall'Agnese, M. Naguib, M. Beidaghi, P. Simon, M.W. Barsoum, Y. Gogotsi, *Capacitive Performance of Titanium Carbide Based MXenes*// ICAC 2013, Osaka, Japan (poster)
6. M.R. Lukatskaya, Y. Dall'Agnese, M. Naguib, M. Beidaghi, P. Simon, M.W. Barsoum, Y. Gogotsi, *Capacitive Performance of Titanium Carbide Based MXenes*// MRS 2013, San-Francisco, USA (poster)
7. V. Presser, E. Perre, M. Lukatskaya, B. Dunn, Y. Gogotsi, *Pseudocapacitive Behavior of Hierarchical Porous Carbide-Derived Carbon with Integrated Niobium Pentoxide Nanoparticles*// ECS 2012, Hololulu, USA (poster)
8. M.R. Lukatskaya, *Synthesis and investigation of the $SrFe_{12}O_{19}$ anisotropic nanostructures in porous alumina films*// The 2-nd International Competition of scientific Papers in

Nanotechnology for young researches, "Rusnanotech 2009", Moscow, Russia (poster)

9. M.R. Lukatskaya, K.S. Napolskii, L.A. Trusov, A.A. Eliseev, M. Jansen, P.E. Kazin *Magnetic nanocomposites based on anodic alumina oxide prepared by infiltration technique//* E-MRS 2009, Symposium E, Strasbourg, France (poster)
10. M.R. Lukatskaya, K.S. Napolsky. *Synthesis of the nanocomposites for magnetic and optical applications //* Forum "Rusnanotech 2008", Moscow, Russia (poster)
11. A.S. Vyacheslavov, M.R. Lukatskaya, A.A. Eliseev, A.V. Lukashin, Yu.D. Tretyakov, *Synthesis of iron and cobalt nanoparticles in pores of zeolites and mesoporous aluminosilicates //* E-MRS 2007, Symposium M, France, Strasbourg (poster)
12. A.S. Vyacheslavov, M.R. Lukatskaya, A.A. Eliseev, A.V. Lukashin, *Iron- and cobalt-containing nanocomposites based on micro- and mesoporous aluminosilicates* // E-MRS 2006 Spring Meeting, Symposium A, Nice, France (poster)

FILED PATENT

Russian Patent and Trademark Office, protecting document #RU2424043; date issued July 20, 2011

Title: A way of anisotropic nanostructures synthesis by filtration of colloidal solutions through porous membranes with one-dimensional channels
(*In Russian*: Способ получения анизотропных наноструктур путем фильтрации коллоидных растворов через пористые мембраны с одномерными каналами)
Inventors: P.E. Kazin, L.A. Trusov, K.S. Napolskii, M.R. Lukatskaya, A.A. Eliseev

HONORS AND AWARDS

- Drexel University Research Excellence Award, 2014
- Best Poster Award nominee, Spring MRS Meeting, San-Francisco, 2014
- Best Student Poster Award, International Conference of Advanced Capacitors (ICAC), Japan, 2013
- Drexel University International Travel Award, 2013
- 1st place award in the Ceramographic Competition of the American Ceramic Society in SEM category, Materials Science & Technology Conference and Exhibition in Houston, Texas, 2010
- SEM image selected by the Carl Zeiss Nanoimage Contest as one of the six images to be published in the Carl Zeiss 2011 calendar
- Semifinalist of the International Science & Engineering Visualization Challenge, 2010
- 3rd place on International Scientific Conference 'Lomonosov-2006'

WORK / RESEARCH EXPERIENCE

- September 2011-Present: **Research assistant**
  MSE Department Drexel University, Philadelphia, USA
  - Electrode design and investigation of the electrochemical properties of the new materials (2 –Dimensional metal carbides, MXenes)

- Electrochemical characterization of materials using cyclic voltammetry (CV) tests, electrochemical impedance spectroscopy (EIS) and galvanostatic cycling (GC)
- Room temperature synthesis of carbon (CDC) by electrochemical etching of the MAX phases
- Material characterization using scanning electron microscopy (SEM), Raman spectroscopy, dynamic light scattering (DLS), X-ray diffraction (XRD)
- Carbide derived carbons synthesis by high temperature chlorination of carbides and fabrication of the composites for energy storage with transitional metal oxides (i.e. Nb_2O_5)

- September 2005-July 2011: **Research assistant**
  Department of Materials Science, Lomonosov Moscow State University, Russia
  Skills acquired:
  - Electrochemical synthesis of metallic nanowires using porous anodic alumina as a template;
  - Conductivity measurements of single nanowires;
  - Preparation of nanocomposites by filtration under barometric gradient of the colloidal solutions thought porous membranes;
  - Invesigation of nanocomposites magnetic properties using vibration magnetometer and SQUID;
  - Synthesis of porous anodic alumina with various averge pore diameters- from 25 to 300 nm;
  - Soft chemistry synthesis of micro- and mesoporous materials, such as zeolites and mesoporous alumosilicates and nanocomposites based on them;
  - Material characterization using scanning electron microscopy (SEM), Raman spectroscopy, sorption of N_2 at 77K (BET), dynamic light scattering (DLS);

TEACHING/ MENTORING EXPERIENCE

- September 2013-present: **Senior design team mentor [MATE 492]**
  MSE Department Drexel University, Philadelphia, USA
  Senior design team: N. Kirkner, W. Snyder, E. Huston
  Project title: MXene Supercapacitor Electrodes for Flexible Energy Storage Applications

- March 2013-August 2013: **MESC (Materials for energy Storage and Conversion) program** (http://www.u-picardie.fr/mundus_MESC/index.php)
  Supervised master student: C. Sole
  Master thesis title: MXene-Based Multivalent Ion Battery and Supercapacitor Systems

TRAINING AND ATTENDED SCIENTIFIC SCHOOLS

- 09/2012: Research visit and training on the synthesis and characterization of supercapacitors, Group of **Prof. Patrice Simon** at the Université Paul Sabatier, Toulouse, France

- 07-09/2010: **DESY (Deutsches Elektronen-Synchrotron) Summer school** "Use of Synchrotron Radiation in Physics and Chemistry", Hamburg, Germany
- 03/2009: **40th IFF Spring School** "Spintronics − From GMR to Quantum Information", Jülich, Germany

LANGUAGES AND RELATED CERTIFICATES

- English, Russian (Mother Language)
- GRE: Quantitative score **800/800**; Combined score 1250.