

MAXIM ZAKHARKIN

Curriculum vitae

Address: Moscow State University
Chemistry Department
Division of Electrochemistry
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EDUCATION

- Feb 2021 Ph.D. in Materials Science, Skolkovo Institute of Science and Technology, Moscow, Russia
Thesis: “Cathode materials for sodium-ion batteries with NASICON structure”
- June 2016 M.Sc. in Materials Science, Skolkovo Institute of Science and Technology, Moscow, Russia
Thesis: “Synthesis and investigation of cathode materials for lithium- and sodium-ion batteries based on transition metal phosphate olivines”
- Dec 2015 Massachusetts Institute of Technology, USA, Fall Term Studies and Research
- June 2014 M.Sc. (*cum laude*) in Electronics and Nanoelectronics, Saint-Petersburg State Polytechnical University, Saint-Petersburg, Russia
Thesis: «Investigation of electrical properties of thin films and heterostructures based on fluoride superionic conductors»

PROFESSIONAL EXPERIENCE

- March 2021 - present Research Scientist, Moscow State University, Moscow, Russia
- Jan 2017 – Dec 2020 Junior Research Scientist, Rustor, Moscow, Russia
- Jun 2017 – Dec 2020 Junior Research Scientist, Moscow State University, Moscow, Russia
- Jun 2015 – Aug 2015 Research Intern, Systems for Microscopy and Analysis, Moscow, Russia
- Sep 2011 – Jun 2014 Engineer, Research and education center “Physics of Nanocomposite Materials”, Saint-Petersburg, Russia
- Sep 2012 – Jun 2014 Laboratorian, Ioffe Physical Technical Institute, Saint-Petersburg, Russia

RESEARCH INTERESTS AND SKILLS

- *Operando* characterization of electrode materials for metal-ion batteries, Electrochemical studies of metal-ion batteries, Battery prototyping, Electrode-Electrolyte interface in metal-ion batteries, Synthesis and characterization of novel functional materials, Ionic conductors, Ferroelectrics, Cryoprotectors
- X-ray powder diffraction, X-ray photoelectron spectroscopy, Scanning electron microscopy, X-ray absorption spectroscopy, Inorganic Synthesis, Focused ion beam SEM, Energy-dispersive X-ray analysis, Molecular-beam epitaxy, Electron-beam evaporation, Impedance spectroscopy
- Origin, Jana2006, Vesta, Stoe WinXPow, Crystallographica Search-Match, Bruker Diffrac.Eva, Biologic EC-Lab, Elins ES8, Neware BTS, Mathematica, Simulink, LabVIEW, Arduino IDE, AutoCAD, Photoshop, C, C++, C#

LANGUAGE SKILLS

Russian mother tongue, *English* fluent, *German* basic.

AWARDS

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| 2020 | International Centre for Diffraction Data ICDD Scholarship, winner |
| 2020 | Best Talk Award on the Lomonosov Conference (Moscow, Russia), 1 st prize |
| 2019 | Haldor Topsøe A/S Scholarship, 1 st prize |
| 2019 | Best Talk Award on the Lomonosov Conference (Moscow, Russia), 3 rd prize |
| 2018 | Best Poster Award on the 5th International Conference on Sodium Batteries (St. Malo, France), 1 st prize |
| 2018 | Best Poster Award on the 3rd International Conference of Young Scientists (Vozdvizhenskoe, Russia), 2 nd prize |
| 2017 | LG Chem Scholarship, 1 st prize |
| 2012-2014 | Academic Excellence Scholarship of SPbSTU |
| 2014 | Certificate for great achievements in research work, SPbSTU |
| 2013 | Best Team Design, Engineering Competitions at SPbSTU, 2 nd prize |

PUBLICATIONS

1. Lakienco, G. P., Bobyleva, Z. V., Apostolova, M. O., Sultanova, Y. V., Dyakonov, A. K., **Zakharkin, M. V.**, Sobolev, N. A., Alekseeva, A. M., Drozhzhin, O. A., Abakumov, A. M., and Antipov, E. V. Sosnowskyi hogweed-based hard carbons for sodium-ion batteries. *Batteries*, **2022**, 10, 131, IF: 5.938.
2. Buryak, N. S.; Anishchenko, D. V.; Levin, E. E.; Ryazantsev, S. V.; Martin-Diaconescu, V.; **Zakharkin, M. V.**; Nikitina, V. A.; Antipov, E. V. High-Voltage Structural Evolution and Its Kinetic Consequences for the Na₄MnV(PO₄)₃ Sodium-Ion Battery Cathode Material. *J. Power Sources* **2022**, 518, 230769, IF: 9.794.

3. Perfilyeva, T. I.; Drozhzhin, O. A.; Alekseeva, A. M.; **Zakharkin, M. V.**; Mironov, A. V.; Mikheev, I. V.; Bobyleva, Z. V.; Marenko, A. P.; Marikutsa, A. V.; Abakumov, A. M.; Antipov, E. V. Complete Three-Electron Vanadium Redox in NASICON-Type $\text{Na}_3\text{VSc}(\text{PO}_4)_3$ Electrode Material for Na-Ion Batteries. *J. Electrochem. Soc.* **2021**, *168* (11), 110550, IF: 4.316.
4. Anishchenko, D. V.; **Zakharkin, M. V.**; Nikitina, V. A.; Stevenson, K. J.; Antipov, E. V. Phase Boundary Propagation Kinetics Predominately Limit the Rate Capability of NASICON-Type $\text{Na}_{3+x}\text{Mn}_x\text{V}_{2-x}(\text{PO}_4)_3$ ($0 \leq x \leq 1$) Materials. *Electrochim. Acta* **2020**, *354*, 136761, IF: 7.336.
5. **Zakharkin M.V.**, Drozhzhin O.A., Ryazantsev S., Antipov E.V., Stevenson K.J. Electrochemical Properties and Evolution of the Phase Transformation Behavior in the NASICON-type $\text{Na}_{3+x}\text{Mn}_x\text{V}_{2-x}(\text{PO}_4)_3$ ($0 \leq x \leq 1$) Cathodes for Na-ion batteries. *J. Power Sources* **2020**, *470*, 1–8, IF: 9.794.
6. Lonchakova, O. V.; Semenikhin, O. A.; **Zakharkin, M. V.**; Karpushkin, E. A.; Sergeyev, V. G.; Antipov, E. V. Efficient Gel-Polymer Electrolyte for Sodium-Ion Batteries Based on Poly(Acrylonitrile-Co-Methyl Acrylate). *Electrochim. Acta* **2020**, *334*, 135512, IF: 7.336.
7. **Zakharkin, M. V.**; Drozhzhin, O. A.; Tereshchenko, I. V.; Chernyshov, D.; Abakumov, A. M.; Antipov, E. V.; Stevenson, K. J. Enhancing Na^+ Extraction Limit through High Voltage Activation of the NASICON-Type $\text{Na}_4\text{MnV}(\text{PO}_4)_3$ Cathode. *ACS Appl. Energy Mater.* **2018**, *1* (11), 5842–5846, IF: 6.959.
8. Drozhzhin, O.A.; Shevchenko, V.A.; **Zakharkin, M.V.**; Gamzyukov, P.I. Improving Salt-to-Solvent Ratio to Enable High-Voltage Electrolyte Stability for Advanced Li-Ion Batteries. *Electrochim. Acta* **2018**, *263*, 127–133, IF: 7.336.
9. Nikitina, V.A.; **Zakharkin, M.V.**; Vassiliev, S.Y.; Yashina, L.V; Antipov, E.V; Stevenson, K.J. Lithium Ion Coupled Electron-Transfer Rates in Superconcentrated Electrolytes: Exploring the Bottlenecks for Fast Charge-Transfer Rates with LiMn_2O_4 Cathode Materials. *Langmuir*, **2017**, *33* (37), pp 9378–9389, IF: 4.331.
10. Vergentev T., Banshchikov A., Koroleva E., Sokolov N., **Zakharkin M.**, Okuneva N. In-plane conductivity of thin films and heterostructures based on LaF_3 - SrF_2 . *St. Petersburg State Polytechnical University Journal. Physics and Mathematics*, **2013**, 4-2 (182), pp. 76 – 83.

[Google Scholar](#)

[Scopus](#)

PATENTS

1. Luchinin, N.D.; Fedotov, S.S.; Tyablikov, O.A.; **Zakharkin, M.V.**; Antipov E.V. Electrode mass, electrode composite material, method of its production and its use in metal-ion accumulators, RU2732368C1, 14 February 2020

CONFERENCE CONTRIBUTIONS

1. XVI International conference "Topical problems of energy conversion in lithium electrochemical systems", Ufa, 20-24 September 2021, talk
2. X National conference on Crystal Chemistry, **Elbrus** region, 5-9 July 2021, talk
3. XXVII International Conference for Students and Young Scientists "Lomonosov-2020", Inorganic Chemistry, **Moscow**, 10-27 November 2020, 1st Best Talk Award
4. 5th International Conference of Young Scientists on "Topical Problems of Modern Electrochemistry and Electrochemical Materials Science", **Moscow**, 13-17 November 2020, talk

5. European Synchrotron Radiation Facility User Meeting 2020, **Grenoble**, France, 2-5 February 2020
6. 4th International Conference of Young Scientists on "Topical Problems of Modern Electrochemistry and Electrochemical Materials Science", **Vozdvizhenskoe**, 15-18 September 2019.
7. 21th Mendeleev Congress on General and Applied Chemistry, **Saint Petersburg**, 9-13 September 2019, talk.
8. Electrochemical Conference on Energy and the Environment: Bioelectrochemistry and Energy Storage ECEE-2019, **Glasgow**, UK, 21-26 July 2019, talk.
9. XXVI International Conference for Students and Young Scientists "Lomonosov-2019", Innovations in Chemistry: advances and perspectives, **Moscow**, 8-12 April 2019, 3rd Best Talk Award.
10. 5th International Conference on Sodium Batteries (ICNaB-2018), **St Malo**, France, 11-15 November 2018, 1st Best Poster Award.
11. 3rd International conference of young scientists "Topical problems of modern electrochemistry and electrochemical materials science", **Vozdvizhenskoe**, 23-26 September 2018, 2nd Best Poster Award.
12. XV International conference "Topical problems of energy conversion in lithium electrochemical systems", **Saint-Petersburg**, 17-20 September 2018
13. 8th Week of the Young Researcher, Chemical Energy Storage and Conversion, **Kazan**, 10-13 September 2018, invited talk.
14. 19th International Symposium on the Reactivity of Solids, **Bayreuth**, Germany, 15-18 July 2018
15. XXV International Conference for Students and Young Scientists "Lomonosov", Innovations in Chemistry, **Moscow**, 9-14 April 2018
16. 2nd International Conference of young scientists "Topical Problems of Modern Electrochemistry and Electrochemical Materials Science", **Vozdvizhenskoe**, 17-20 September 2017
17. XXIV International Conference for Students and Young Scientists "Lomonosov", Innovations in Chemistry, **Moscow**, 10-14 April 2017
18. XIV International Conference "Topical Problems of Energy Conversion in Lithium Electrochemical Systems", **Suzdal**, 11-15 September 2016
19. 2nd Annual Skoltech/MIT/MSU Joint Workshop "Electrochemical Energy Storage: Current Progress and Future Opportunities", **Moscow**, 18-19 July 2016
20. XXVI Russian conference on Electron Microscopy, **Zelenograd**, 30 May – 03 June 2016
21. Students' multidisciplinary conference Skoltech On, **Skolkovo**, 23 October 2015
22. MIT Energy Night, **Cambridge**, MA, 16 October 2015
23. Materials Day at MIT, **Cambridge**, MA, 14 October 2015
24. 1st Annual Skoltech/MIT/MSU Joint Workshop "Electrochemical Energy Storage: Challenges & Prospects", **Moscow**, 8-9 June 2015
25. XLII Week of Science SPbSTU, **Saint-Petersburg**, 2-7 December 2013
26. XLI Week of Science SPbSTU, **Saint-Petersburg**, 3-8 December 2012