

Alexander S. Mikherdov

PhD in Organometallic Chemistry

WPI-ICReDD Postdoctoral Researcher at Hokkaido University, Sapporo, Japan

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General

Date of Birth: 19th August 1993; **Place of Birth:** St Petersburg, Russia

Education

Sept 2015 – Aug 2019 **Candidate of Sciences Degree in Organometallic Chemistry** (eq. PhD), St Petersburg State University (issued at St Petersburg State Technical University), St Petersburg, Russia;
Supervisor: Prof. V. P. Boyarskiy;
Thesis: *Noncovalent interactions in palladium(II) diaminocarbene complexes;*

Sept 2010 – Jul 2015 **Diploma in Chemistry**, St Petersburg State University, St Petersburg, Russia;
Supervisor: Prof. V. P. Boyarskiy
Thesis: *Interaction of α -aminoazoles and isocyanide ligands in palladium complexes;*

Research Experience

Sept 2022 – present **WPI-ICReDD Postdoctoral Fellow**, Hokkaido University, Sapporo, Japan,
Research group of Prof. Mingoo Jin;
Research topic: *Development of amphydynamic crystalline materials based on organometallic chemistry;*

Sept 2021 – Sept 2022 **JSPS Postdoctoral Fellow**, Hokkaido University, Sapporo, Japan,
Research group of Prof. Hajime Ito;
Research topic: *Rational design of co-crystals involving gold complexes for new luminescent materials;*

Sept 2019 – Aug 2021 **Assistant Lecturer**, Institute of Chemistry SPbU, St Petersburg, Russia;

Sept 2015 – Aug 2019 **PhD Researcher**, Institute of Chemistry SPbU, St Petersburg, Russia,
Research group of Prof. Vadim Yu. Kukushkin;
Research topic: *Noncovalent interactions in isocyanide/diaminocarbene complexes of platinum group metals;*

Oct – Nov 2018 **Internship at University of Jyväskylä**, Jyväskylä, Finland,
Research group of Prof. Matti Haukka;
Research topic: *Organoselenium compounds as halogen bond acceptors;*

Jul – Aug 2017 **Internships at University of the Free State**, Bloemfontein, South Africa,
Nov – Dec 2016 Research group of Prof. Andreas Roodt;
Research topics: *1) Kinetic study of the isomerization of binuclear diaminocarbene Pd^{II} complexes; 2) Mechanistic and kinetic studies of addition of O- and N-nucleophiles to nitrilium closo-decaborate clusters*

Teaching Activities

Sept – Dec 2019 Organic chemistry laboratory classes for undergraduate student (Institute of Chemistry SPbU)

Skills

Lab skills	Synthesis of inorganic, coordination, and organic compounds, crystal engineering, reaction kinetics studies, photophysical studies
Software	<i>Basic:</i> ChemOffice, Microsoft Office, EndNote <i>Crystal data refinement and analysis:</i> Olex2, XDS, CrysAlic, CCDC Software, CrystalExplorer <i>Data fitting, analysis, and visualization:</i> Origin, MatLab, VMD <i>Theoretical calculations:</i> Gaussian, Multiwfn, Chemcraft <i>Graphic Design:</i> Blender, Adobe Illustrator
Equipment	Single-crystal and powder X-ray diffraction, solution and solid-state NMR spectroscopy, UV-vis, fluorescence, IR spectroscopies

Funding (As Principal Investigator or Fellow)

2021–2022	JSPS Postdoctoral Fellowship for Research in Japan (Short-term): <i>Rational design of co-crystals involving gold isocyanide complexes for new luminescent materials</i>
2018–2020	RFBR research grant (18-33-00704 mol_a): <i>Effect of non-covalent interactions on the structure and properties of aminocarbene complexes of platinum group metals</i>

Selected Publications

1. M. Jin*, R. Kitsu, N. Hammyo, A. Sato-Tomita, M. Mizuno, **A. S. Mikherdov**, M. Tsitsvero, A. Lyalin, T. Taketsugu, H. Ito*, «A Steric-Repulsion-Driven Clutch Stack of Triaryltriazines: Correlated Molecular Rotations and a Thermo-Responsive Gearshift in the Crystalline Solid», *J. Am. Chem. Soc.*, 2023, *145*, 27512–27520; DOI: [10.1021/jacs.3c08909](https://doi.org/10.1021/jacs.3c08909);
2. **A. S. Mikherdov**, M. Jin*, H. Ito*, «Exploring Au(I) Involving Halogen Bonding with N-Heterocyclic Carbene Au(I) Aryl Complexes in Crystalline Media», *Chem. Sci.*, 2023, *14*, 4485–4494; DOI: [10.1039/D3SC00373F](https://doi.org/10.1039/D3SC00373F). (Highlighted on the *Inside Front Cover*; Included in the [2023 Chemical Science HOT Article Collection](#))
3. **A. S. Mikherdov***, A. S. Novikov, V. P. Boyarskiy, V. Yu. Kukushkin*, «The Halogen Bond with Isocyanide Carbon Reduces Isocyanide Odor», *Nat. Commun.*, 2020, *11*, 2921; DOI: [10.1038/s41467-020-16748-x](https://doi.org/10.1038/s41467-020-16748-x); (Highlighted by *Chemistry World*)
4. M. A. Kinzhalov*, M. V. Kashina, **A. S. Mikherdov**, E. A. Mozheeva, A. S. Novikov, A. S. Smirnov, D. M. Ivanov, M. A. Kryukova, A. Yu. Ivanov, S. N. Smirnov, V. Yu. Kukushkin, K. V. Luzyanin*, «Dramatically Enhanced Solubility of Halide-Containing Organometallic Species in Diiodomethane: The Role of Solvent...Complex Halogen Bonding», *Angew. Chem. Int. Ed.*, 2018, *57*, 12785–12789; DOI: [10.1002/anie.201807642](https://doi.org/10.1002/anie.201807642);
5. **A. S. Mikherdov**, M. A. Kinzhalov, A. S. Novikov, V. P. Boyarskiy*, I. A. Boyarskaya, D. V. Dar'in, G. L. Starova, V. Yu. Kukushkin*, «Difference in Energy between Two Distinct Types of Chalcogen Bonds Drives Regioisomerization of Binuclear (Diaminocarbene)Pd^{II} Complexes», *J. Am. Chem. Soc.*, 2016, *138*, 14129; DOI: [10.1021/jacs.6b09133](https://doi.org/10.1021/jacs.6b09133);

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Scholarships and Awards

2021	<i>Medal of the Russian Academy of Sciences for Young Scientists</i> (by Russian Academy of Sciences)
2019	<i>INEOS Open Cup 2019 Best Poster Presentation</i> (by INEOS RAS)
2018	<i>Laureate of Struchkov Prize for Young Scientists</i> (by Struchkov Prize Society)
2018	<i>V. I. Spitsyn Prize for Young Scientists</i> (by Chemical Department of Moscow State University)
2018	<i>"Analit-Shimadzu" Scholarship</i> (by Analit Ltd.)

Selected Presentations

1. *"Exploring Au(I) Involving Halogen Bonding with N-Heterocyclic Carbene Au(I) Aryl Complexes in Crystalline Media"*, 26th Congress and General Assembly of the International Union of Crystallography (IUCr 2023), Melbourne, Australia, **2023** (poster)
2. *"The noncovalent approach in the design of luminescent crystalline rotors"*, The 102nd CSJ (The Chemical Society of Japan) Annual Meeting, online, **2022** (oral)
3. *"Noncovalent interactions with isocyanides and their metal complexes"*, CHAINS 2019: Chemistry as Innovating Science, Eindhoven, Netherlands, **2019** (poster)
4. *"Non-covalent interactions in isocyanide/diaminocarbene complexes of platinum group metals"*, 43rd International Conference on Coordination Chemistry (ICCC 2018), Sendai, Japan, **2018** (oral)

References

Prof. Vadim Yu. Kukushkin

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Prof. Andreas Roodt

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Prof. Mingoo Jin

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