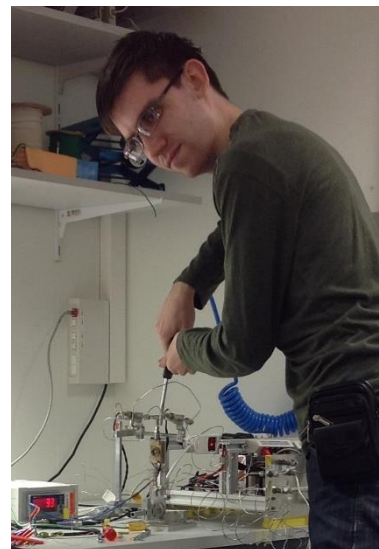


# CURRICULUM VITAE

Andrei A. Tereshchenko

*Modified 10 February 2022*



## **Born**

Rostov-on-Don (Russian Federation) 07 October 1994

## **Citizenship status**

Russian Federation

## **Languages**

- Russian (native speaker)
- English (upper-intermediate, B2)

## **Education**

- 2018 – 2022 postgraduate student in Physics at Southern Federal University (Russia)
- 2016 – 2018 Master degree in Physics, Southern Federal University (Russia)
- 2012 – 2016 Bachelor degree in Nanotechnology and microsystem technique, Southern Federal University (Russia)

## **Work experience**

- Invited Researcher in Paul Scherrer Institute (02.2022-07.2022)
- Engineer in The Smart Materials Research Institute, Southern Federal University (since 2018)
- Laboratory Assistant in The Smart Materials Research Center, Southern Federal University (2016-2018)
- Research practice in the Laboratory of X-ray structure analysis in Research Institute of Physics, Southern Federal University (2014-2016)

## **Current affiliation**

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## **Fields of interests**

Experimental study of the structure and properties of zeolites, metal-organic frameworks (MOFs) and noble metal nanoparticles for solving fundamental problems in material science and application in heterogeneous catalysis

## **Methods**

- FTIR spectroscopy (also in combination with adsorption of probing molecules)
- DFT calculations and modelling (VASP), Machine Learning (Python)
- X-ray diffraction, Rietveld analysis (Jana2006)
- X-ray absorption spectroscopy (Athena, Artemis, FEFF, FDMNES, FitIt, PyFitIt)

## Projects participation (grants)

### *Current:*

- Nanocatalysts for photostimulated green hydrogen production: molecular design and advanced characterization assisted by machine learning methods (from 13.10.2021 till 31.12.2023) — funded by the Ministry of Science and Higher Education of the Russian Federation (grant № 075-15-2021-1389); [Ref.](#)
- Laboratory operando technique of metal nanoparticles diagnostics based on the infrared spectroscopy of adsorbed molecules (from 01.10.2020 till 01.10.2022) — funded by the RFBR (grant № 20-32-90048); [Ref.](#)
- Rational design of Pd-catalysts for C-H activation and Ru-catalysts for C=O hydrogenation: from operando X-ray absorption spectroscopy identification of metal complexes to multi-technique machine learning-based characterization (from 01.01.2020 till 31.12.2022) — funded by the Russian Science Foundation (grant № 20-43-01015); [Ref.](#)
- Swiss-Russian project "Rationalizing the structure of the active sites in heterogeneous catalysts using X-ray absorption and infrared spectroscopies strengthened by machine learning algorithms" submitted to «2020 Call for Research Preparation Grants with Russia» and funded by the University of Geneva acting as the Leading House for Swiss Science and Technology Cooperation with Russia and the CIS Region.

### *Finished:*

- Multispectral characterization of the multicomponent systems using machine learning algorithms (from 18.11.2019 till 01.12.2021) — funded by the Russian Foundation for Basic Research (RFBR, project number 20-32-70227); [Ref.](#)
- Palladium nanocatalysts in important oxidation reactions: synchrotron radiation studies using in-situ, operando and transient approaches (from 23.10.2017 till 30.06.2020) — funded by the Russian Science Foundation (grant № 17-72-10245); [Ref.](#)
- Method for quantitative analysis of local atomic structure based on resonant X-ray spectroscopy data (from 13.06.2019 till 31.12.2020) — funded by the President's Grant of Russian Federation for young scientists MK-2730.2019.2 (№ 075-15-2019-1099); [Ref.](#)
- X-ray spectroscopy studies using large scale facilities in operando conditions and supercomputer modeling of electronic structure of the functional materials (from 16.02.2017 till 31.12.2019) — funded by the Grant of the Southern Federal University (VnGr-07/2017- 08); [Ref.](#)

## Key scientific publications

- **Andrei Tereshchenko**, Danil Pashkov, Alexander Guda, Sergey Guda, Yury Rusalev, Alexander Soldatov "Adsorption Sites on Pd Nanoparticles Unraveled by Machine-Learning Potential with Adaptive Sampling" *Molecules* 2022 27 (2) 357 (Impact-factor: 4.412) DOI: [10.3390/molecules27020357](https://doi.org/10.3390/molecules27020357)
- **Andrei Tereshchenko**, Alexander A. Guda, Vladimir Polyakov, Yury V. Rusalev, Vera Butova and Alexander V Soldatov "Pd nanoparticles growth monitored by DRIFT spectroscopy of adsorbed CO" *Analyst* 2020 145 7534-7540 (Impact-factor: 3.978) DOI: [10.1039/D0AN01303J](https://doi.org/10.1039/D0AN01303J)
- Usoltsev, O. A.; Pnevskaya, A. Y.; Kamyshova, E. G.; **Tereshchenko, A. A.**; Skorynina, A. A.; Zhang, W.; Yao, T.; Bugaev, A. L.; Soldatov, A. V. "Dehydrogenation of ethylene on supported palladium nanoparticles: A double view from metal and hydrocarbon sides" *Nanomaterials* 2020 10 (9) 1643 (Journal Cover) (Impact-factor: 4.324 ) DOI: [10.3390/nano10091643](https://doi.org/10.3390/nano10091643)
- **Andrei Tereshchenko**, Vladimir Polyakov, Alexander Guda, Tatiana Lastovina, Yulia Pimonova, Alexey Bulgakov, Andrey Tarasov, Leonid Kustov, Vera Butova, Alexander Trigub and Alexander

Soldatov "Ultra-Small Pd Nanoparticles on Ceria as an Advanced Catalyst for CO Oxidation" *Catalysts* 2019 9 (4) 385 (Impact-factor: 3.465) DOI: 10.3390/catal904038

• A.A. Skorynina, **A.A. Tereshchenko**, O.A. Usoltsev, A.L. Bugaev, K.A. Lomachenko, A.A. Guda, E. Groppo, R. Pellegrini, C. Lamberti, A.V. Soldatov "Time-dependent carbide phase formation in palladium nanoparticles" *Radiation Physics and Chemistry* 2019 (Impact-factor: 1.435) DOI: 10.1016/j.radphyschem.2018.11.033

• A. Bugaev, V. Polyakov, **A. Tereshchenko**, A. Isaeva, A. Skorynina, E. Kamyshova, A. Budnyk, T. Lastovina, A. Soldatov "Chemical Synthesis and Characterization of Pd/SiO<sub>2</sub>: The Effect of Chemical Reagent" *Metals* 2018 8 (2) 135 (Impact-factor: 1.984) DOI: 10.3390/met8020135

*(full list of publications is available on the links:*

<https://orcid.org/0000-0001-5102-6743>

<https://www.scopus.com/authid/detail.uri?authorId=57200797814>

[https://www.researchgate.net/profile/Andrei\\_Tereshchenko](https://www.researchgate.net/profile/Andrei_Tereshchenko)

<https://publons.com/researcher/1812826/andrei-a-tereshchenko/>)

### **Patents**

- Patent №2708899 FIPS: "Method for determining oxygen storage capacity in oxide materials"
- Patent №190702 FIPS: "Cell for spectral diagnostics"
- Patent №180097 FIPS: "Cell for laboratory FTIR- and X-ray absorption spectral diagnostics"

### **Internships and scientific visits**

- RF president scholarship for studying abroad (Paul Scherrer Institute, Villigen, Switzerland), since 01.02.2022 to 31.07.2022
- Training School for young scientists from Russia in collaboration between European Synchrotron Research Facility (ESRF, Grenoble, France) and NRC «Kurchatov Institute» (Moscow, Russia), since 01.04.2019 to 05.04.2019
- Preparation and performing catalytic tests and measurements at the SuperXAS and nanoXAS beamlines of Swiss Light Source (Paul Scherrer Institute, Villigen, Switzerland) in the framework of collaboration on the project "Uncovering the dynamic structure of active sites in selective oxidation catalysts using time-resolved X-ray absorption spectroscopy", since 23.09.2018 to 23.10.2018
- In situ spectroscopic study of porous zeolite materials using a vacuum glass line in NIS Interdepartmental Centre and CrisDi Interdepartmental Centre (University of Turin, Turin, Italy) in order to collaborate on the Russian Government Mega-grant project 14.Y26.31.0001, since 29.06.2017 to 05.08.2017

### **Experience of experiments on large scale facilities**

- Surface-Core-Shell Structure of Palladium Carbide Phase by In Situ XANES, EXAFS and XRPD (BM31, ESRF, France, December 2017)
- Experimental studies of oxidative catalytic reactions (ID09, ESRF, France, May 2018)

### **Achievements and awards**

- M.A. Blokhin Fellowship in X-ray Spectroscopy of Southern Federal University (Russia, 2020)
- Governor Scholarship (Russia, 2020)
- Government Scholarship (Russia, 2019)
- Grant for postgraduate education at the Southern Federal University (Russia, 2018)
- Individual scholarship of "Center-Invest" Bank (Russia, 2018)
- III prize for the best oral presentation on the International Workshop for Young Researchers «Smart Materials & Mega-Scale Research Facilities» (Russia, 2018)
- Scholarship of the Southern Federal University Endowment Fund (2018)

- Travel Grant for internship in NIS Interdepartmental Centre and CrisDi Interdepartmental Centre at University of Turin (Italy, 2017)
- 69 Southern Federal University Conference in Physics – I Prize in the section «Spectroscopy and computer modelling», II Prize in section «Graduate Students» (Russia, 2017)
- 68 Southern Federal University Conference in Physics – II Prize in the section «Nanotechnologies and nanomaterials» (Russia, 2016)
- The best report in XXII Russian science conference of physicists-student and young scientists in the section «Material science» (Russia, 2016)
- Conference of the XII Southern Scientific Center of Russian Academy of Sciences – II Prize in the section «Nanotechnologies and nanomaterials» (Russia, 2016)

### Conference participation

- **A.A. Tereshchenko**, A.A. Guda, V.A. Polyakov, A.V. Soldatov, In situ monitoring of Pd/CeO<sub>2</sub> nanoparticles growth by means of FTIR spectroscopy // VI International scientific school-conference for young scientists Catalysis: from science to industry, October 6-10 2020, Tomsk, Russia, book of abstracts, p. 33.
- **A. Tereshchenko**, V. Polyakov, A. Guda, L. Kustov, A. Tarasov, A. Trigub, A. Sodatov, Low-temperature catalysts based on ceria supported ultra-small Pd, Au and PdAu nanoparticles: synthesis and characterization // Emerging synchrotron techniques for characterization of energy materials and devices, September 23-25 2019, Grenoble, France, book of abstracts, p. 67
- **A. A. Tereshchenko**, A. A. Guda, A. P. Budnyk, Palladium nanoparticles on different supports revealed by adsorption of probe molecules using infrared spectroscopy // International Workshop for Young Researchers «Smart Materials & Mega-Scale Research Facilities», April 23 2018, Rostov-on-Don, Russia, book of abstracts, p. 28
- A. Bugaev, A. Skorynina, **A. Tereshchenko**, et al Surface-Core-Shell Structure of Palladium Nanoparticles // International Workshop for Young Researchers «Smart Materials & Mega-Scale Research Facilities», April 23, 2018, Rostov-on-Don, Russia, book of abstracts, p. 21.
- A. A. Guda, O.V. Safonova, **A.A. Tereshchenko** et al, In situ characterization of ceria based nanocatalysts// Design of polyfunctional structures: theory and synthesis, October 23-36 2018, Rostov-on-Don, Russia, book of abstracts, p. 35
- **A. A. Tereshchenko**, A. A. Guda, V A. Polyakov, The in situ FTIR study of the noble nanoparticles supported by ceria using CO probing molecules// Design of polyfunctional structures: theory and synthesis, October 23-36 2018, Rostov-on-Don, Russia, book of abstracts, p. 84
- **A. A. Tereshchenko**, X-ray structural studies of the ferroelectric phase transition in thin strontium-barium niobate films // XXII Russian science conference of students physicists and young scientists, April, 21-28 2016, Taganrog, Russia, book of abstracts, p. 523