Dr. Georgiy Shakhgildyan

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SUMMARY

Experienced Materials Science Scientist with expertise in developing new functional materials for optics and photonics. Proficient in various characterization methods including optical spectroscopy, X-ray diffraction, and electron microscopy. Skilled in researching optical glass-ceramics containing metal nanoparticles, quantum dots, and rare-earth ions. Published over 70 research articles with over 600 citations, holds 9 patents, and has acquired over 100000 € research funding.

EDUCATION

PhD in Chemical Science

2012-2015

Mendeleev University of Chemical Technology

Technology of silicate and refractory nonmetallic materials
PhD thesis: “Phosphate glasses activated by metal nanoparticles and rare-earth elements ions”

Master degree in Chemical Technology

2007-2012

Mendeleev University of Chemical Technology

Technologies of inorganic substances and high-temperature materials
Honor thesis: “Porous glass microspheres for targeted drug delivery”

RESEARCH AND TEACHING EXPERIENCE

November 2021 — till now

Mendeleev University of Chemical Technology (Department of Glass and Glass-Ceramics)

Moscow, muctr.ru/

Associate professor (docent)

Research activities: (i) Development of optical glass-ceramics containing gold nanoparticles and rare-earth ions *(Russian Science Foundation Project)*; (iii) Development of transparent glass-ceramics and methods for ion- strengthening for ultra-hard cover glasses *(Russian Science Foundation Project)*; (iii) Development of optical memory based on laser nanostructured glass *(Foundation for Perspective Studies Project)*.

Educational activities: updating and development of educational programs, lectures, seminars and laboratories, supervision of internships, scientific guidance of students.

March 2018 — November 2021

Mendeleev University of Chemical Technology (Department of Glass and Glass-Ceramics)

Moscow, www.muctr.ru/

Assistant professor

Research activities: (i) Series of research in micro- and nanomodification of glass and glass-ceramics, spatially-selected precipitation of noble nanoparticles and quantum dots, laser crystallization of glass ("*Megagrant" p.220 Project*). (ii) Development of transparent glass-ceramics *(LG CHEM R&D Project)*.

Educational activities: seminars and laboratories, supervision of internships, scientific guidance of students.

September 2012 — March 2018

Mendeleev University of Chemical Technology (Department of Glass and Glass-Ceramics)

Moscow, www.muctr.ru/

Leading Engineer

Research activities: (i) Development of glass microspheres for targeted drug delivery; (ii) Research on the formation of gold nanoparticles in phosphate glasses; (iii) Development of transparent glass-ceramics with near-zero CTE; (iv) Research and Development of glass color filters ("*Megagrant" p.220 Project*).

ACQUIRED FUNDING, RESEARCH GRANTS

2022-2024

Russian Science Foundation, Project 22-73-00236, 34300 EUR

"Development of optical glass-ceramics co-activated with rare-earth metal ions and noble metal nanoparticles with controlled position of plasmon resonance for applications in photonics"

2020-2021

Mendeleev University Project 2020-012, 23000 EUR

"Development of new luminescent media based on glasses activated by metal nanoparticles and rare earth ions"

2020-2021

Grant of the President of the Russian Federation for Young Scientists MK-1194.2020.3, 14000 EUR

"Nanostructured substrates based on nanoporous glasses activated by noble metal nanoparticles for the detection of ultra-low concentrations of biomolecules by giant Raman spectroscopy"

2019-2020

Russian Foundation for Basic Research Project 19-32-80032, 23000 EUR

"Femtosecond laser formation of three-dimensional microchannel structures based on silver nanoaggregates in phosphate glasses for integrated quantum photonics chips"

2018-2019

Russian Foundation for Basic Research Project 18-33-00595, 11000 EUR

"Local formation of silver clusters and nanoparticles in phosphate glasses under the action of femtosecond laser radiation"

1. Alekseev, R. O., Avakyan, L. A., Tretiakov, E. A., **Shakhgildyan, G. Y.**, Veligzhanin, A. A., Vishnyakov, G. N., Sigaev, V. N. (2025). Tantalum and niobium–same row, different connectivity. A XAFS study of La2O3-Nb2O5-B2O3 and La2O3-Ta2O5-B2O3 glasses. *Journal of Alloys and Compounds*, 1014, 178622.
2. Vetchinnikov, M. P., **Shakhgildyan, G. Y.**, Ignat'eva, E. S., Ozerova, A. I., Runina, K. I., & Sigaev, V. N. (2025). Thermostimulated Formation of Silver Nanoaggregates and Their Effect on the Photoluminescence of Nd3+ Ions in Barium Phosphate Glass. *Glass and Ceramics*, 81(9), 391-397.
3. Vetchinnikov, M. P., Srabionyan, V. V., Zinina, E. M., Ignat'eva, E. S., Runina, K. I., Durymanov, V. A., **Shakhgildyan, G. Y.,** Sigaev V.N, Bugaev, L. A. (2024). Local atomic structure and optical properties of zinc-phosphate glasses single-doped with Ag, Au, Rb, Nd and Er. *Journal of Non-Crystalline Solids*, 646, 123250.
4. Srabionyan, V. V., Vetchinnikov, M. P., Rubanik, D. S., Durymanov, V. A., Viklenko, I. A., Avakyan, L. A., **Shakhgildyan, G. Y.,** Sigaev V.N, Bugaev, L. A. (2024). Local electric field enhancement in the vicinity of aggregates of Ag, Au, Rb containing nanoparticles in oxide glasses. *Journal of Non-Crystalline Solids*, 631, 122927.
5. **Shakhgildyan, G.,** Avakyan, L., Atroshchenko, G., Vetchinnikov, M., Zolikova, A., Ignat'eva, E., Sigaev, V. (2024). Ultra-broadband plasmon resonance in gold nanoparticles precipitated in ZnO-Al2O3-SiO2 glass. *Ceramics*, 7(2), 562-578.
6. **Shakhgildyan, G.,** & Ojovan, M. I. (2024). Advanced Glasses and Glass-Ceramics.
7. Naumov, A. S., **Shakhgildyan, G. Y.**, Golubev, N. V., Lipatiev, A. S., Fedotov, S. S., Alekseev, R. O., Sigaev, V. N. (2023). Tuning the Coefficient of Thermal Expansion of Transparent Lithium Aluminosilicate Glass-Ceramics by a Two-Stage Heat Treatment. *Ceramics*, 7(1), 1-14.
8. Sukharina, G. B., Ermakova, A. M., Alekseev, R. O., **Shakhgildyan, G. Y.**, Veligzhanin, A. A., Avakyan, L. A., Sigaev, V. N. (2023). Effect of B2O3 concentration on the local atomic structure of lanthanum in lanthanum-borate glasses: XANES study and the principle of crystal-chemical similarity of the short-range order in glasses and crystals. *Journal of Non-Crystalline Solids*, 616, 122454.
9. **Shakhgil'dyan, G. Y.**, Durymanov, V. A., Avakyan, L. A., Atroshchenko, G. N., Vetchinnikov, M. P., Alekseev, R. O., Sigaev, V. N. (2023). CeO2 Influence on Au Plasmonic Nanoparticle Formation in ZnO–MgO–Al2O3–SiO2 Glass. *Glass and Ceramics*, 80(5), 215-222.
10. **Shakhgil'dyan, G. Y**., Alekseev, R. O., Naumov, A. S., Zolikova, A. A., Savinkov, V. I., & Sigaev, V. N. (2023). Investigation of the Structure and Influence of Ion-Exchange on the Microhardness of Low-Alkali, Transparent, Gahnite-Based Glass-Ceramics. *Glass and Ceramics*, 80(3), 94-99.
11. **Shakhgildyan, G. Y.**, Alekseev, R. O., Golubev, N. V., Savinkov, V. I., Naumov, A. S., Presnyakova, N. N., & Sigaev, V. N. (2023). One-step crystallization of gahnite glass-ceramics in a wide thermal gradient. *Chemengineering*, 7(2), 37.
12. Alekseev, R. O., Avakyan, L. A., **Shakhgildyan, G. Y.**, Komandin, G. A., Savinkov, V. I., Romanov, N. A., Sigaev, V. N. (2022). Local atomic structure of the high refractive index La2O3–Nb2O5–B2O3 glasses. *Journal of Alloys and Compounds*, 917, 165357.
13. Lipatiev, A. S., Fedotov, S. S., Lotarev, S. V., Lipateva, T. O., **Shakhgildyan, G. Y.**, & Sigaev, V. N. (2022). Single-pulse laser-induced Ag nanoclustering in silver-doped glass for high-density 3D-rewritable optical data storage. *ACS Applied Nano Materials*, 5(5), 6750-6756.
14. **Shakhgildyan, G.**, Durymanov, V., Ziyatdinova, M., Atroshchenko, G., Golubev, N., Trifonov, A., Sigaev, V. (2022). Effect of gold nanoparticles on the crystallization and optical properties of glass in ZnO-MgO-Al2O3-SiO2 system. *Crystals*, 12(2), 287.
15. Lipatiev, A. S., **Shakhgildyan, G. Y.**, Vetchinnikov, M. P., Lee, H., Heo, J., Lotarev, S. V., & Sigaev, V. N. (2022). Direct precipitation of CdS nanocrystals in glass by ultrafast laser pulses. *Materials Letters*, 307, 130974.
16. **Shakhgildyan, G.**, Avakyan, L., Ziyatdinova, M., Atroshchenko, G., Presnyakova, N., Vetchinnikov, M., Sigaev, V. (2021). Tuning the plasmon resonance of gold

nanoparticles in phase-separated glass via the local refractive index change. *Journal of Non-Crystalline Solids*, 566, 120893.

17. **Shakhgildyan, G. Y.,** Lipatiev, A. S., Fedotov, S. S., Vetchinnikov, M. P., Lotarev, S. V., & Sigaev, V. N. (2021). Microstructure and optical properties of tracks with precipitated silver nanoparticles and clusters inscribed by the laser irradiation in phosphate glass. *Ceramics International*, 47(10), 14320-14329.

AWARDS

1) Winner of the Wiley's Guest Editor Mentorship Program (2025)
2) Winner of the Moscow Government Prize for young scientists for 2023 (Moscow Government, 2024)
3) Gratitude "For the implementation of projects aimed at improving the level of teaching of natural sciences, building network interaction between schools and universities and enterprises, organizing a system of vocational guidance for schoolchildren" (Agency for Strategic Initiatives, 2023)
4) Finalist (III place) of the All-Russian Prize "For Fidelity to Science" (Ministry of Education and Science, 2022)
5) Medal "For contribution to the implementation of the Year of Science and Technology", (Administration of the President of the Russian Federation, Government of the Russian Federation, 2022)
6) Finalist of the All-Russian "Knowledge" Award "For active educational activities at the university" (Russian Society "Knowledge", 2021)
7) Finalist (II place) of the All-Russian Prize "For Fidelity to Science" (Ministry of Education and Science, 2021)
8) Finalist of the RAS Prize for the best works on the popularization of science in 2020 (Russian Academy of Sciences, 2020)
9) Gratitude "For many years of conscientious work, great contribution to the training of personnel for the domestic chemical industry and in connection with the 120th anniversary of the founding of the university" (Ministry of Education and Science, 2018).
10) Winner of the "START" competition (Innovation Promotion Foundation, 2018).
11) Winner of the competition "Accelerator of innovative projects "Big Exploration 2018"" (Ministry of Education and Science of the Perm Territory, 2018).
12) Winner of the Grand Prix of the "Eureka! Concept" competition (National Intellectual Development Foundation, 2017)
13) Winner of the competition "Best Lecturer in the Country" in the category "Lecturer of the Future" (Russian Society "Knowledge", 2017).

PROFESSIONAL MEMBERSHIP

1) Expert of the Russian Science Foundation
2) Expert of the strategic academic leadership program "Priority-2030"
3) Member of the council of the Moscow city regional branch of the Russian Society "Knowledge"
4) Member of the Board of Trustees of the Association Science Slam Russia
5) Reviewer of scientific journals (Nanomaterials, Ceramics, Materials, Optical Materials, Crystals, Journal of Non-Crystalline Solids, Journal of Luminescence, IEEE Photonics Journal, Glass and Ceramics, etc.).
6) Guest editor of the special issue "Advanced Glasses and Glass-Ceramics" of Ceramics magazine (2023-2024)
   https://www.mdpi.com/journal/ceramics/special_issues/Y15S3F09W2
7) Guest editor of the special issue "Synergy in Polyphase Materials: Harnessing the Power of Glass and Ceramics" of Materials (2024-2025)
   https://www.mdpi.com/journal/materials/special_issues/07TMCV7U9S