


## Portfolio of scientific supervisors of the participants of the postgraduate track of the International Olympiad of the Global Universities Association

University	Siberian Federal University
Level of English proficiency	B2
Educational program and field of the educational program for which the applicant will be accepted	2.6.2 Metallurgy of Ferrous, Non-ferrous and Rare Metals
List of research projects of the potential supervisor (participation/leadership)	Mass and heat transfer during electrolysis of molten salts
List of the topics offered for the prospective scientific research	<p>Bubbles behavior during molten salts electrolysis</p> <p>Aluminium refinery in a thin layer electrolysis</p> <p>Inert anode electrolysis</p> <p>Low temperature electrolytes in the aluminium reduction technology</p> <p>Mass transfer in the cappillars during molten salts electrolysis.</p> <p>Aluminium reduction cell as a dissipative system.</p> <p>Alumina behavior in the aluminium reduction technology.</p> <p>Ways to intensify molten salts electrolysis.</p>
 <p>Research supervisor: Petr V. Polyakov, Doctor of Chemical Science (Higher Certification Commission under the Council of Ministers of the USSR)</p>	<b>Chemistry and material science</b>
	<p><b>Supervisor's research interests:</b></p> <p>Mass and heat transfer during molten salts electrolysis, mass transfer in capillars. High temperature electrochemistry suspensions</p>
	<p><b>Research highlights:</b></p> <p>Optical research; holographic interferometry, classical electrochemistry, suspensions electrochemistry</p>
	<p><b>Supervisor's specific requirements:</b></p> <ul style="list-style-type: none"> <li>• Electrochemical equipment</li> <li>• Knowledge of Russian language</li> <li>• Differential equations. Solutions</li> <li>• Physical chemistry and electrochemistry</li> </ul>
	<p><b>Supervisor's main publications:</b></p> <ol style="list-style-type: none"> <li>1. Cathode Process at the Electrolysis of the <math>KF-AlF_3-Al_2O_3</math> Melts and Suspensions. Andrey Suzdaltsev, Andrey Nikolaev, Peter Polyakov, and Yurii Zaikov. Journal of</li> </ol>

The Electrochemical Society. February 2017, <https://ecs-journals.msubmit.net/cgi-bin/main.plex>.

2. Transfer Processes in the Bath of High Amperage Aluminium Reduction Cell. Andrey Zavadyak, Peter Polyakov, Andrey Yasinskiy, Iliya Puzanov, Yuri Mikhalev, Sergey Shakhrai.
3. Nikita Sharypov, Olga Yushkova, Andrey Polyakov. The Minerals, Metals & Materials Society 2019, C. Chesonis (ed.), Light Metals 2019, P.773-777, [https://doi.org/10.1007/978-3-030-05864-7\\_94](https://doi.org/10.1007/978-3-030-05864-7_94).
4. Anode Overvoltages on the Industrial Carbon Blocks. Peter Polyakov, Andrey Yasinskiy, Andrey Polyakov, Andrey Zavadyak, Yuri Mikhalev, Iliya Puzanov. The Minerals, Metals & Materials Society 2019, C. Chesonis (ed.), Light Metals 2019, p.811-816.
5. Electrochemical reduction and dissolution of liquid aluminium in thin layers of molten halides Yasinskiy A., Polyakov P., Moiseenko I., Padamata S.K., Yang Y., Wang Z., Suzdaltsev A. Electrochimica Acta. 2021. T. 366. C. 137436.
6. Improving corrosion resistance of Cu–Al-based anodes in KF–AlF<sub>3</sub>–Al<sub>2</sub>O<sub>3</sub> melts, Padamata S.K., Yasinskiy A., Bermeshev T., Polyakov P., Shabanov A., Yang Y.-J., Wang Z.-W., Cao D. Transactions of Nonferrous Metals Society of China. 2022. T. 32. № 1. C. 354-363.

**Results of intellectual activity:**

Dependences of the thickness of the diffusion and temperature near-electrode layers on electrolysis parameters.

Regimes of spontaneous surface convection and self-organization during the electrolysis of molten salts