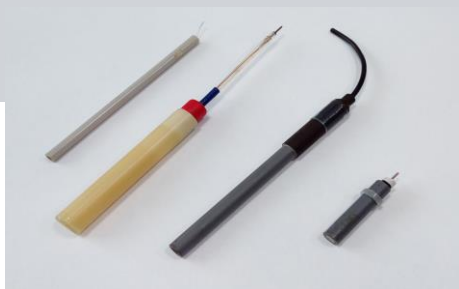


Ionometry Scientific Group

Room 2091



G.A. Khripoun
Engineer



The head of the group: K.N. Mikhelson
Professor
konstantin_mikhelson@outlook.com
k.mikhelson@spbu.ru

V.M. Keresten
PhD Student
v.keresten@spbu.ru



Assistant

E. E. Korepanov
Student



The Objects of the Study

Ion-selective electrodes with ionophore-based membranes: experimental and theoretical study by the means of

- potentiometry
- voltammetry
- computer simulation
- chronoamperometry/coulometry
- electrochemical impedance and chronopotentiometry

N. Iurgenson, N. Vladimirova, V. Polukeev, K. Mikhelson, D. Kirsanov. Designing new sulfate ionophores for potentiometric membrane sensors: Selectivity assessment and practical application. *Sens. Actuators B. Chemical* 422 (2025) 136663. **IF 8.0**

V.M. Keresten, A.Yu. Popov, K.N. Mikhelson. Peculiarities of the potentiometric response of ISEs with membranes containing two neutral ionophores and an excess of ion-exchanger: Experiment and modeling. *Sens. Actuators B. Chemical* 417 (2024) 136090. **IF 8.0**

V. Keresten, F. Lazarev, K. Mikhelson. Transfer of Sodium Ion across Interface between Na⁺-Selective Electrode Membrane and Aqueous Electrolyte Solution: Can We Use Nernst Equation If Current Flows through Electrode? *Membranes* 14 (2024) 74. **IF 3.3**

V.M. Keresten, K.N. Mikhelson. The problem of single-ion activities in view of measurements with ion-selective electrodes. *J. Solid State Electrochem.* 28 (2024) 1243–1257. **IF 2.6**

V.M. Keresten, A.G. Bykov, I.V. Gofman, E.V. Solovyeva, A.Yu. Vlasov, K.N. Mikhelson. Non-constancy of the bulk resistance of ionophore-based ion-selective membranes within the Nernstian response range: A semi-quantitative explanation. *J. Membr. Sci.* 683 (2023) 121830. **IF 9.5**

V. Keresten, K. Mikhelson. Voltammetric Ion Sensing with Ionophore-Based Ion-Selective Electrodes Containing Internal Aqueous Solution. *Improving Lifetime of Sensors, Membranes* 12 (2023) 1048. **IF 4.2**

A.V. Bondar, V.M. Keresten, K.N. Mikhelson. Registration of small (below 1%) changes of calcium ion concentration in aqueous solutions and in serum by the constant potential coulometric method. *Sens. Actuators B. Chemical* 354 (2022) 131231. **IF 8.4**

A. Bondar, K. Mikhelson. Constant Potential Coulometric Measurements with Ca²⁺-Selective Electrode: Analysis Using Calibration Plot vs. Analysis Using the Charge Curve Fitting. *Sensors* 22 (2022) 1145. **IF 3.8**

Participation in Conferences

11th Frumkin Symposium (7 – 12.10 2024, Russia)

XI Conference on Electrochemical Methods of Analysis “EMA-2024” (12 – 17.05 2024, Russia)

Conference on Electrochemistry (23 – 27.10 2023, Russia)

Euroanalysis Geneva 2023 (27 – 31.08 2023, Switzerland)

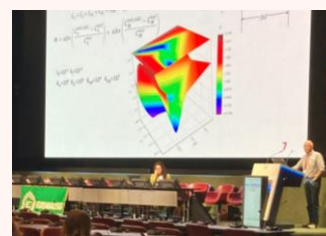
AnalytiX-2023 (17 – 19.05 2023, Japan)

Matrafüred 2022 International Conference on Chemical Sensors (12 – 17.06 2022, Hungary)



At the conference Matrafüred 2022

At the conference Euroanalysis 2023



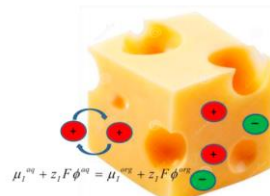
Membrane formation: on the left – it is fixed with glue, on the right – formed by drop-casting

The book *Ion Selective Electrodes* by K.N. Mikhelson

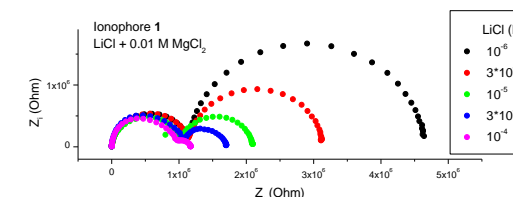


Current Research Areas

Fundamental Research of the ISEs Functioning Mechanisms



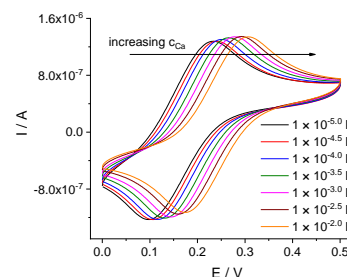
The paradox of non-constancy of ISE bulk resistance within the Nernstian response range: theoretical explanation and possible practical application of the effect



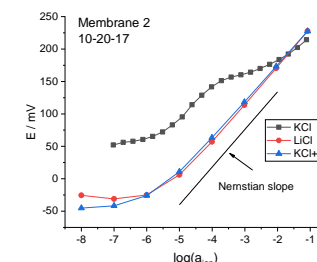
Study of processes occurring on the membrane/solution interface

Voltammetric Measurements with Ion Selective Electrodes

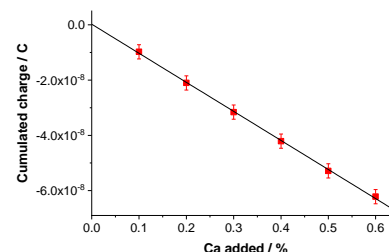
Development of sensors suitable for analysis in voltammetric mode



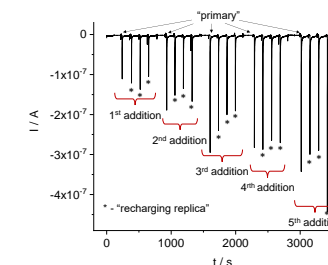
Study of ISEs containing several ionophores which can be used for multianalyte voltammetric analysis



Chronoamperometric/Coulometric Measurements with Ion Selective Electrodes



Increasing the sensitivity of analysis with ISE to less than a percent of the relative change in analyte concentration (compared to several percent in classical potentiometry)



Increasing the reliability of analysis with ISE by using new type of a signal

Participation in Conferences