

## Konstantin Mikhelson & Elena Solovyeva scientific group



Konstantin N. Mikhelson

Ionophore-based ion-selective electrodes (ISEs) - *in-depth* experimental and theoretical studies of ISEs: potentiometry, chronopotentiometry, electrochemical impedance spectroscopy, computer simulations.



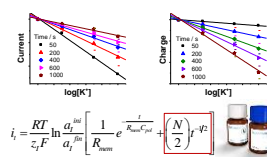
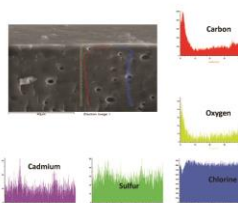
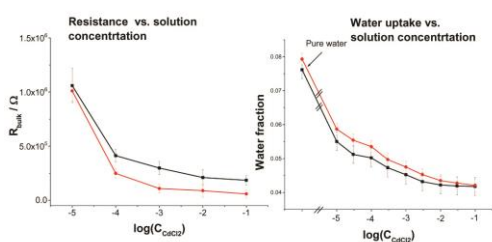
Galina A. Khripoun

For a first time, the origin of the deviations of the real-world ISEs response slope from the theoretical Nernstian value was explained quantitatively in terms of transmembrane fluxes of electrolytes.



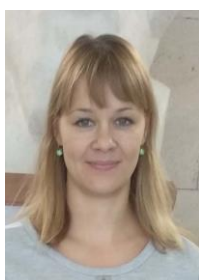
Valentina M. Keresten

Current fundamental research is focused on the paradox of the non-constancy of the bulk resistance of ISEs within the Nernstian response range. To this end, it is proposed, for the first time, consider ISE membranes as heterogeneous materials. Practically oriented studies are focused on large improvement of the sensitivity of the measurements by use of ISEs in chronoamperometric and coulometric modes.



Anna V. Bondar

$$i_t = \frac{RT}{z_i F} \ln \frac{a_i^{int}}{a_i^{ext}} \left[ \frac{1}{R_{mem}} e^{-\frac{i}{R_{mem} C_{ext}}} + \frac{N_i^2}{2} \nu_i^2 \right]$$



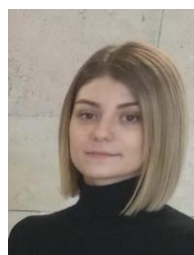
Elena V. Solovyeva

Obtaining new organo-inorganic nanocomposites with a controlled size and structure, distinguished by the presence of "hot spots".



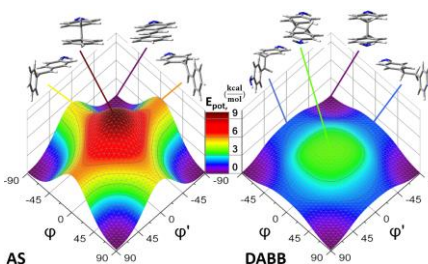
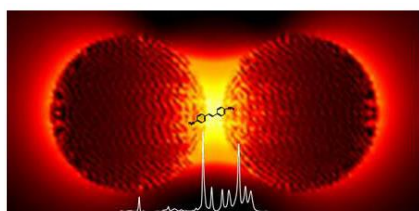
Alexei N. Smirnov

Novel bioanalytical applications of SERS spectroscopy. In particular, a method has been developed for the determination of folic acid in pharmaceuticals. Sensitivity of the SERS spectra to conformational transitions associated with the rotation of methyl groups was shown, for the first time, with neocuproine as example.



Olga V. Odintsova

Current works includes the development of optical labels for fluorescence imaging and agents for therapeutic hyperthermia based on silver and gold nanoparticles, as well as synthesis of osteo-inductive materials based on doped hydroxyapatite for endoprosthetics.



Alexei S. Strelnikov



Ye.O. Kondratyeva, E.G. Tolstopjatova, D.O. Kirsanov, K.N. Mikhelson, Chronoamperometric and coulometric analysis with ionophore-based ionselective electrodes: A modified theory and the potassium ion assay in serum samples, *Sens. Actuat. B*, 310 (2020) 127894 DOI: 10.1016/j.snb.2020.127894 **IF 7.100**

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