



Volume 2b

**Book of abstracts
in 6 volumes**

**Saint Petersburg
9 –13 September**



Volume 2b

**Book of abstracts
in 6 volumes**

**Saint Petersburg
9 –13 September**

STRUCTURAL AND ELECTROKINETIC CHARACTERISTICS OF COMPOSITE BISMUTH-CONTAINING MATERIALS BASED ON NANOPOROUS GLASSES

Kuznetsova A.S.,^{a,b} Ermakova L.E.,^a Antropova T.V.^b

^a*St. Petersburg State University, Institute of Chemistry,
University prospectus 26 St. Petersburg, Peterhof, 198504, Russia,
e-mail: a_kuznetsova95@mail.ru*

^b*Institute of Silicate Chemistry I.V. Grebenshchikov Russian Academy of Sciences, emb. Makarova 2,
St. Petersburg, 199034, Russia*

High-silica glasses modified with bismuth oxide possess luminescence in a wide spectral range from the visible to the near-IR region¹, thanks to which they are widely used in the creation of optical light guides, amplifiers and tunable lasers.

Glassy bismuth-containing materials (BCM) were obtained by doping micro- (MIP) and macroporous (MAP) glasses – the products of through chemical etching of two-phase alkaline borosilicate glasses with a solution of bismuth nitrate $\text{Bi}(\text{NO}_3)_3$ in 2M nitric acid for one or three days with an intermediate (after each day) heat treatment at $T = 50^\circ\text{C}$. Then the impregnated matrices were subjected to special heat treatment at $T = 650^\circ\text{C}$ to form bismuth active centers.

The paper on the development of research² compares the structural characteristics (volume porosity, average pore radius, tortuosity coefficient, structural resistance coefficient) and the electrokinetic potential of BCM with the characteristics of glasses not modified by bismuth.

X-ray fluorescence and energy-dispersive X-ray analysis revealed that the BCM obtained from MAP membranes contain 2.91 wt. % bismuth after 1 treatment cycle and 3.54 wt. % after 3 cycles, from MIP – 0.49 wt. % after 1 and 0.52 wt. % after 3 cycles.

It was found that for bismuth-containing glasses, the absolute values of the zeta potential against the background of 10^{-2} M KNO_3 solutions at $\text{pH} = \text{const}$ for matrices obtained from MAP membranes are lower than from MIP.

References

1. Girsova M.A., Firstov S.V., Antropova T.V. Glass Physics and Chemistry, 2019, 45, 98.
2. Kuznetsova A.S., Ermakova L.E., Antropova T.V., Girsova M.A. V-th International Conference on Colloid Chemistry and Physicochemical Mechanics, 2018, St. Petersburg, 315.

The reported study was funded by RFBR according to the research project № 18-03-01206.