

## COMPREHENSIVE RESEARCH OF HISTORICAL INK: THE CONCEPT OF LARGE MANUSCRIPTS ARRAYS STUDYING

The existing coverage of the material in the study of ink of Old Russian manuscripts was extremely insufficient to reveal their real information potential [1], in particular, in the identification of different levels of relationships between the dye and the executed text, characteristic for the manuscript culture of Old Rus'. We propose a comprehensive approach to the laboratory studies of manuscripts, which makes it possible to study large arrays with varying degrees of detail and includes: spectro-zonal visualization of text, express XRF analysis of the ink basic elemental composition, detailed analysis of the elemental composition and structure of ink by transmission electron microscopy with EDX, Raman and IR spectroscopy for organic compounds identification.

An improvement of the developed approach was made by using experimental inks replicated from some historical receipts as well as actual historical documents. In order to IR-spectra processing verification we used high-effective liquid chromatography with mass-spectrometry as a method for identification of organic compounds in general.

We hope that the proposed approach to large-scale historical ink analysis will improve traditional paleographic methods in manuscript studies.

Research is supported by Russian Foundation for Basic Research (Project № 18-00-00429 (K) «Development of nondestructive analysis of manuscripts and parchments and advancing of new materials and methods for their conservation» including projects № 18-00-00311 and № 18-00-00407).

### References:

1. E.S. Bystrova, E.M. Lotsmanova, E.A. Lyakhovitsky *et al.*, On the problem of technological research of ancient Russian ink: X-ray fluorescence analysis of manuscripts (In the press –*Studia Slavica 2* (2021))

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**Session Classification:** Will not participate

**Track Classification:** Section 9. Nuclear-physical methods in the study of cultural heritage objects.