

Spectroscopic analysis of wall paintings from Peć Archbishopric, Serbia

M. Stojanović-Marić¹, D. Bajuk Bogdanović², I. Holclajtner-Antunović²

¹ *National Museum Belgrade, 11000 Belgrade, Serbia*

² *Faculty of Physical Chemistry, University of Belgrade, P.O. Box 47, 11158 Belgrade, Serbia*

Monastery Complex of Peć is located at the entrance to Rugova Canyon, in the municipality of Peć. It presents the seat and mausoleum of the Serbian archbishops and patriarchs. It is assumed that the first church of the monastery complex was built in the third decade of the 13th century. The church was dedicated to the Holy Apostles, and it was painted for the first time in 1260 (it was painted again in the 14th and in the 17th century). In the 14th century, on the north of the Church of the Holy Apostles, the Church of St. Demetrius was built, and on the south of the Church of the Holy Apostles, the Church of the Holy Virgin and the Church of St. Nicholas were built. An entire history of the styles of medieval wall paintings from 1300-1620 can be seen on the walls of the Monastery Complex of Peć. The Complex is on a permanent conservation, and in 2006 it was inscribed on the UNESCO World Heritage List.

In this study wall paintings from the Church of the Holy Virgin were investigated by combination of micro Raman and FTIR spectroscopies and optical and scanning electron microscopy-energy dispersive X-ray spectroscopy (SEM-EDS). The wall paintings belong to the fourth decade of the 14th century and are well preserved. The presence of the characteristic peaks from calcite in all Raman spectra obtained from the substrate, as well as from painted layers, confirms the application of the fresco technique. The combination of micro Raman and SEM-EDS revealed the existence of azurite in blue colours and green earth (celadonite) in green colours. In some fragments green grains of malachite were identified beside grains of azurite, as these minerals may sometimes occur admixed or banded together. Different red tones are attained by hematite, vermilion and red lead. The analysis of yellow grains led to identification of iron(III) oxyhydroxide, α -FeOOH, also known by the name of the mineral goethite. Identification of pigment orpiment, As₂S₃ on the saints haloes was identified by SEM-EDS. The application of a carbon black layer below a blue one was a common method in Byzantine hagiography. The purpose of the black layer is to enhance the blue colour tone. Lazurite was applied only in combination with hematite, magnetite, vermilion and carbon for attaining pink colour. Organic binder was applied below black layer. The painting technique used in the Church of the Holy Virgin was compared with techniques applied in Serbian medieval monasteries Žiža and Mileševa.