

Abstract. The royal icon of Jesus Christ belongs to the Saint Archangels Michael and Gabriel church from the village of Gheorgheni, the municipality of Feleacu, county of Cluj; it dates from the 18th century and was painted in 1702 by Vasile Zugrav – an icon artist from Saliste, the county of Sibiu. Considering the importance, the age and the process of restoration of this icon, researches have been done to establish the composition of the painting materials. These have been made using non-invasive FTIR and XRF investigations for each color in different points.

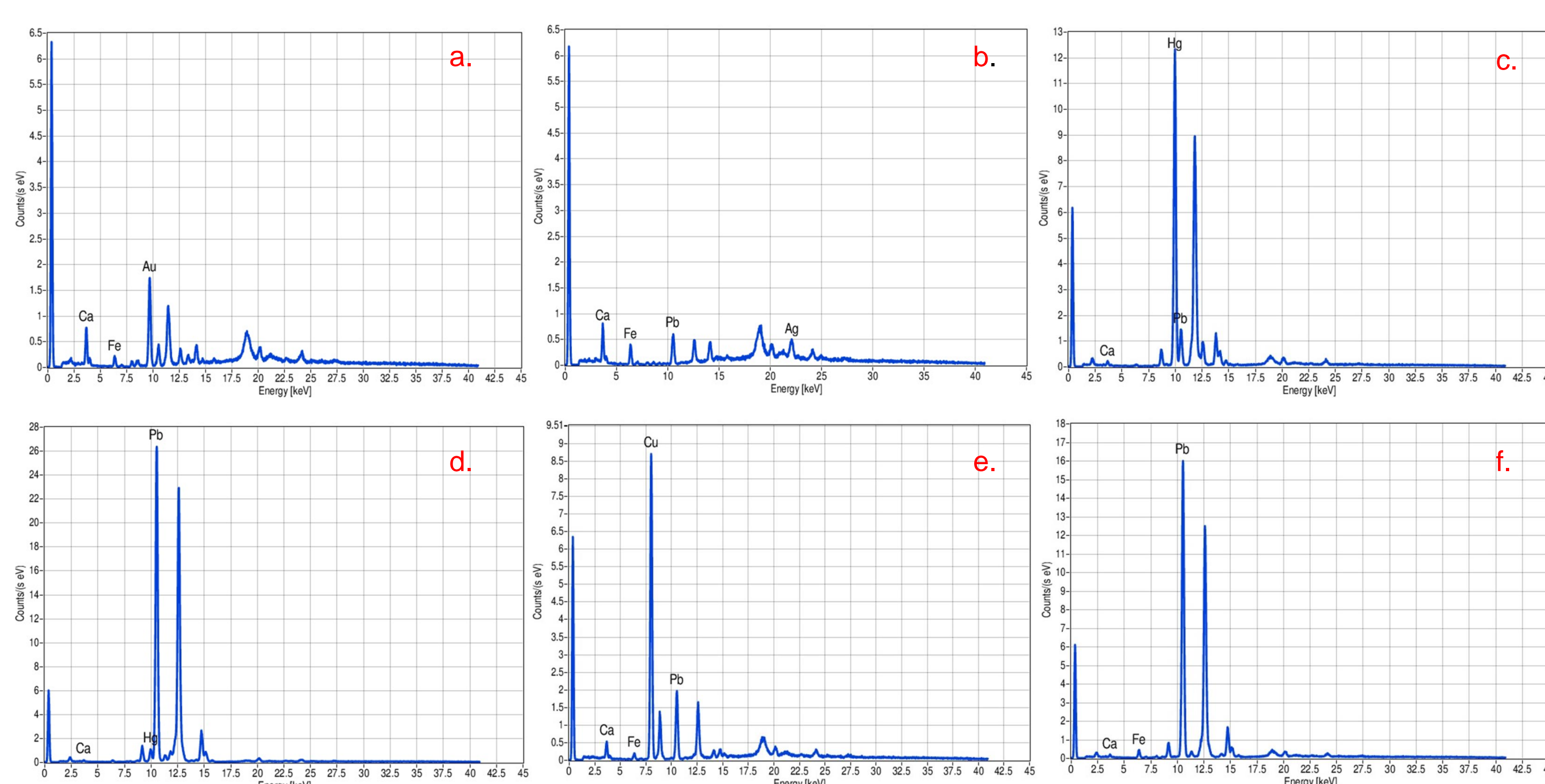
Introduction. The royal icon of Jesus Christ belongs to the Romanian Orthodox Parish "Saints Archangels Michael and Gabriel", from the village of Gheorgheni, Feleacu town, Cluj County. It dates back to the 18th century and was probably painted by Vasile Zugrav – an icon craftsman from Sălişte, Sibiu County – in 1702. The icon depicts Jesus Christ in half length, flanked in the upper side by Mother of God and Saint John the Baptist. The icon is painted on a wooden panel made by joining several boards. The panel is surrounded by a wooden frame whose upper cut-out is different from the side and lower ones. There is also a golden frame inside the panel with a very thin cut-out on the side and lower parts, and the rope motif on the top vaulted one. Jesus Christ is represented in the center of the icon, filling most of its space. The miter on His head is the only element that indicates that we are in front of the typology of the *Great High Priest*, since his vestments belong to the other very well-known iconographic type, the *Master Teacher*. The combination between these two typologies makes this icon an interesting and unique one. Both vestments, the red and the blue, are richly ornamented.

Experimental:

Nondestructiv analysis:

- X-ray fluorescence elemental analyses (XRF)
- FTIR reflectance spectroscopy,

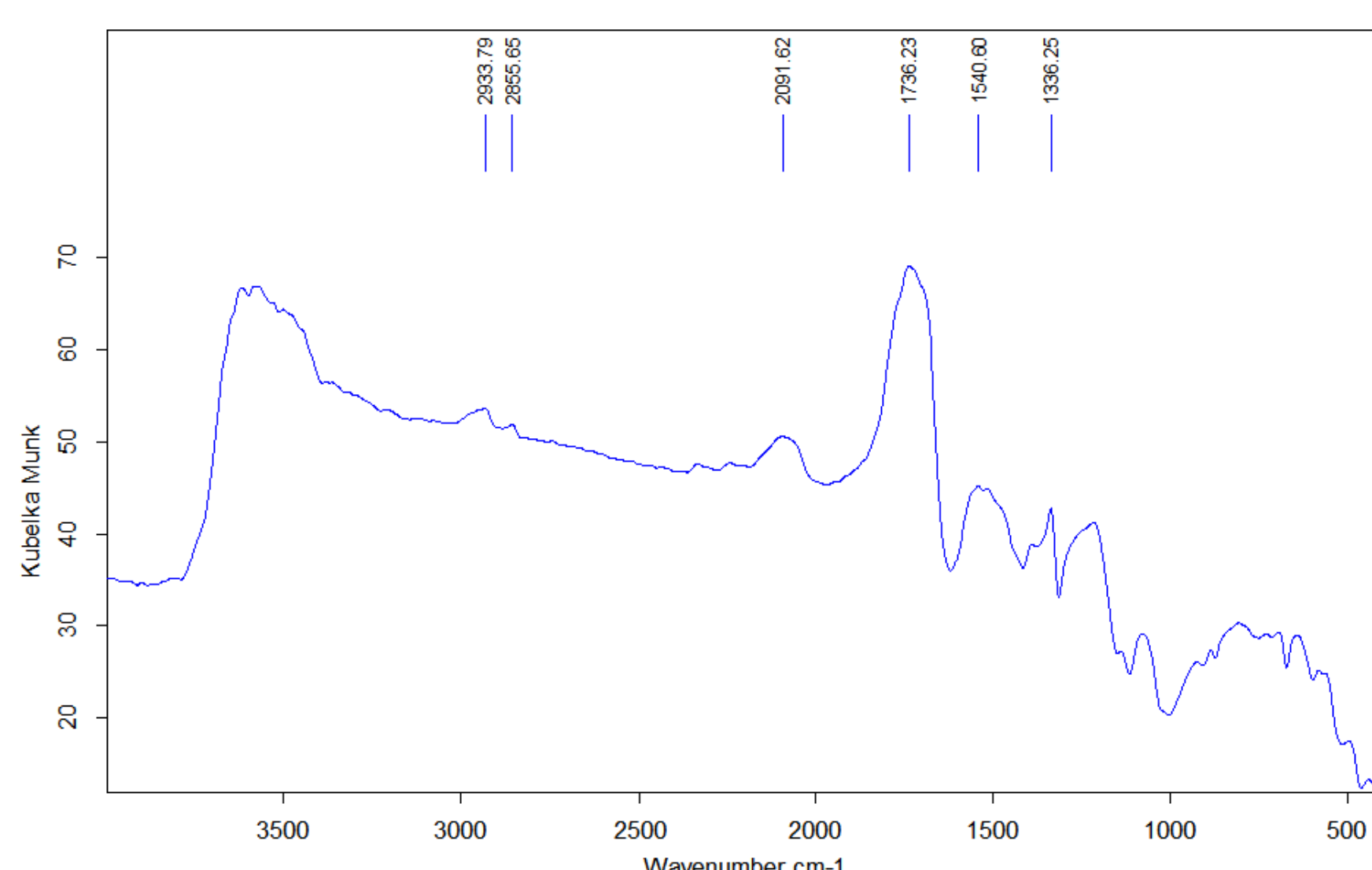
XRF analysis



XRF results for: a. upper golden background – gold leaf, b. silver-white clothing – traces of silver foil, c. Christ's red clothing – cinnabar, d. Christ's carnation white – white lead with traces of cinnabar, e. Virgin's Mary green clothing - malachite, f. Christ's gray-blue clothing – traces of Prussian blue (see FTIR)

Results

FTIR reflection spectroscopy



FTIR spectrum for blue color – Jesus Christ's vestment.

- 2934 cm^{-1} and 2856 cm^{-1} : CH₂ groups, indicating the presence of linseed oil
- 2092 cm^{-1} – Prussian blue
- 1743 - cholesteryl ester (egg yolk degradation)
- 1541, 1336 - proteins



Conclusion: The royal icon of Jesus Christ was painted on wood with materials specific to those times. A layer of primer was applied on the wooden board, and another layer of white lead was added before the painting process. The painting was made in tempera grassa technique (egg yolk and linseed oil). The pigments used were: white lead, mercury red, malachite green, Prussian blue, black iron oxide, carbon black. Golden leaf was used for the halo and background and silver leaf to ornate Christ's clothing.

Acknowledgments: This work was supported by a grant of the Romanian Ministry of Research and Innovation, CCCDI—UEFISCDI, project number PN-III-P1-1.2-PCCDI-2017-0812/53PCCDI, within PNCI III.

REFERENCES

- Bratu, I., C. Măruțoiu, D. Nemeş, D.Toader, O.F. Nemeş and R.C. Suci, 2020, Characterization of the Paint from "The Lord's Transfiguration" Icon by Grigore Ranite, Analytical Letters, DOI: 10.1080/00032719.2020.1743716
- Mastrotheodoros, G.P., M. Theodosios, E. Filippaki, G. Konstantinos and K.G. Beltsios, 2020, By the Hand of Angelos? Analytical Investigation of a Remarkable 15th Century Cretan Icon, Heritage 3, 1360–1372; doi: 10.3390/heritage3040075
- Vokotopoulos, P., 1995. Byzantine Icons; Ekdotiki Athinon: Athens, Greece.
- Christopoulou, E., N. Laskaris and T. Ganetsos, 2020, Pigment identification of two post-bizantine icons of Theodoros Poulakis by PXRF and raman spectroscopy: case study, Scientific Culture, vol. 6, No. 2, 65-72
- Nemeş, D., C. Măruțoiu, I. Bratu, C. Neamțu, I. Kacso, O.F. Nemes, and I. Udrea, 2020, Characterization of the Paint Used by Dumitru Ispas in the Wooden Straja Church, Cluj County, Romania, Analytical Letters, 54:1-2, 255-264, DOI: 10.1080/00032719.2020.1749649
- Neamțu, C., I. Bratu, C. Măruțoiu, V.C. Măruțoiu, O.F. Nemeş, R. Comes, Ş. Bodi, Z. Buna and D. Popescu, 2021, Component Materials, 3D Digital Restoration, and Documentation of the Imperial Gates from the Wooden Church of Voivodeni, Sălaj County, Romania, Appl. Sci. 11, 3422. <https://doi.org/10.3390/app11083422>
- Moldovan, Z., I. Bratu, C. Măruțoiu, I. Kacso, L. Troşan, D. Pop-Toader, O.F. Nemeş and C. Tănăsela, 2016, Characterization of an Eighteenth-Century Wooden Icon from the Ethnographic Museum of Transylvania, Analytical Letters, 45(16) 2597-2605, DOI:10.1080/00032719.2015.1121394.