

Poster Presentation

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On the grounds of icons from national museum in krakow

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Among various types of cultural heritage objects, icons belong to the most interesting and not too often investigated group. Similarly to the investigations of easel paintings, only tiny amounts of samples taken from icons can be available for scientific studies. In the literature very few technical papers on icons can be found, so there is a shortage of information for comparative studies in this subject.

During the medieval and post-medieval era, calcium carbonate was the most commonly used ground material in the northern regions of Europe, while gypsum was preferred in the southern ones [1]. XRPD is one of the best techniques for precise characterization of these materials. In our work, we have undertaken XRPD investigations of ground layer composition in twenty five post-Byzantine icons from the collection of the National Museum in Krakow, The Bishop Erazm Ciolek Palace (Poland). The aim of our research was to supplement the data obtained by optical microscopy (OM), scanning electron microscopy connected with X-ray spectrometry (SEM-EDX) and other methods.

All XRPD measurements were performed using laboratory X-ray source; an X'PERT PRO MPD apparatus, working in θ/θ Bragg/Brentano geometry, CuK α radiation ($\lambda=1.5418 \text{ \AA}$), equipped with diffracted-beam graphite monochromator and a PIXcel PSD detector, in a 2θ range from 5 to 85°. Prior to each measurement the minute amount of each sample was placed on the zero-background sample holder and fixed to it with the use of propanol. Phase analysis of the obtained results was performed by X'pert HighScore software and PDF-4+ Database.

In our studies on the grounds of icons from the Bishop Erazm Ciolek Palace, we have detected gypsum, anhydrite, calcite, dolomite and other compounds which were purposely added to the material of the preparation layer, or were contaminants of the raw materials. In one case we have also identified weddellite [Ca(C₂O₄)(H₂O)₂.37; PDF 04-011-6807] which is a product of the ground layer deterioration.

Our results allowed us to divide the investigated icons into four groups: containing only calcite (group I - 8 icons), containing gypsum and anhydrite (group II - 6 icons), containing only gypsum (group III - 4 icons) in the ground layer. The composition of the ground layer in the rest of the investigated objects (group IV) was more rich and contained a mixture of carbonates and/or sulfates with addition of other compounds.

Given the lack of bibliographic resources, this research is one of the first integrated approaches to determine the components of artistic materials used in icons from the collection of the National Museum in Krakow. We hope that identification of the materials present in the ground layer of an icon will help in collecting historical information which is necessary for the documentation of the artwork and important for appropriate conservation strategies.

[1] Mastrotheodoros, G. P. (2016). *Archaeometry*, 58, 5 830–847.

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