

SYNCHROTRON RADIATION BASED INVESTIGATIONS OF COLORED LAYERS , BINDING MATERIALS AND RESINS OF THE GOD PTAH-SOKAR-OSIRIS WOODEN STATUETTE AND ITS MUMMIFIED FALCON WHICH ARE DATING BACK TO 26TH PHARAONIC DYNASTY.

Dina Mohamed ATWA KHALIL

The Grand Egyptian Museum – Conservation Center, Giza, Egypt

Abstract:

The main goal of this work was to study the colour palette of a polychrome wooden statuette of the God Ptah –Sokr- Osiris from 26th dynasty of ancient Egypt. Analysis of painted layered materials, preparation layers, resins and linen rolls samples have been performed using synchrotron radiation based μ (FT-IR) and (XRD) techniques. The application of SR techniques provided new and valuable information about the chemical nature of pigments, adhesives and binding materials that used by the ancient maker over other conventional spectroscopic techniques. In an attempt to evaluate the degree of statuette wood degradation, the wood sample was identified using the thin sections with SEM. SEM micrographs of wood allow identifying it as a (*Ficus sycamores*). The preparation layer was proved to be a mixture of calcite and quartz. The chromatic palette used in the statuette was identified as hematite, Egyptian blue, arsenic sulphides, possibly malachite and carbon from charred animal origin. The crystallinity of cellulose has been measured using Segal formula which indicates extreme degradation of the statuette wood. Such study was mandatory in order to set the best strategies for preserving the statuette.

Introduction:

Ancient Egyptian polychrome wooden artifacts have gained much interest in the last decades not only to identity the original materials used by the ancient makers, explain the deterioration processes and establish the strategy of conservation, but also for correlating these results with the archaeological and anthropological studies. The God Path – Sokar – Osiris models appeared at the end of the New Kingdom and became a very common feature of elites' burials through late period until the roman one. (1). Our wooden statuette is composed by two parts, the first part is the body of statuette and its base that have wonderful coloured decorations of gold and colored oxides as we concluded from X- ray fluorescence results (XRF). The second part is the mummified falcon that was decorated with a layer of gold (much of which had fallen) and was preserved in a rectangular cavity covered by a lid, in the base of the statuette. The dimensions of the statuette are 85 cm length and 23 cm shoulder width; it was based on a rectangular wooden base (77 cm, 27 cm, 10 cm). The wooden statuette was carved from a single piece of wood, in the form of God Ptah-Sokar-Osiris with a human face, probably representing the face of the deceased (Figure 1a and 1b).

Figure 2, a,b and c showed the patterns of SR-XRD analysis of our minute samples. Despite of small samples size, we could identify the colored layers clearly. The crystallinity index of cellulose measured to be 66.6 % while the value of standard *Ficus sycamores* is 76.0%.



Figure 1a and b represents the images of the object including the positions of the samples.

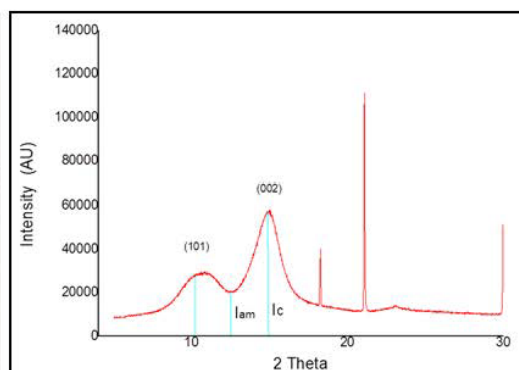
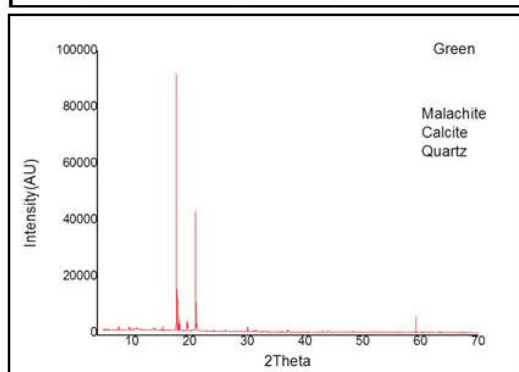
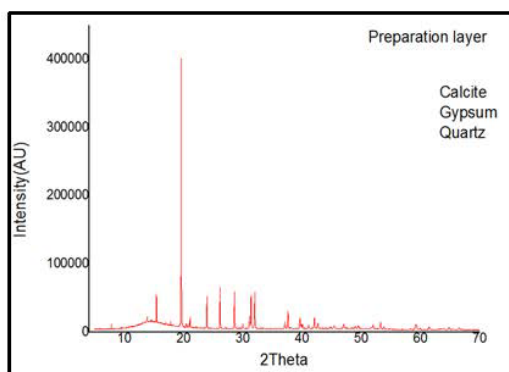


Figure 2 a,b,c, represents XRD patterns for the sample of wood, preparation layer and green color respectively.



REFERENCES

- [1] G. First, The Ptah – Sokar - Osiris statuettes in the Cracow collections, Studies in Ancient Art and Civilization (Jagiellonian University Krakow), 13, 2009, pp. 109-139.
- [2] Joy Mazurek, Marie Svoboda and Michael Schilling. Heritage 2019, 2, 1960–1985doi:10.3390/heritage2030119
- [3] Nati Salvadó, Salvador Butí, Mark J Tobin, Emmanuel Pantos, Advantages of the Use of SR-FT-IR Microspectroscopy: Applications to Cultural Heritage, Analytical Chemistry 77(11):3444-51(2005).
- [4] Sawsan. S. DARWIS, Nesrin M.N. EL HADID, Maisa MANSOUR " THE EFFECT OF FUNGAL DECAY ON FICU SYCOMORUS WOOD" INTERNATIONAL JOURNAL OF CONSERVATION SCIENCE, Volume 4, Issue 3, 2013: 271-282
- [5] Miriam Unger, Eric Mattson, Catherine Schmidt, Patterson, Zahrasadet Alavi, David Carson, Carol J. Hirschmugl, Appl Phys A (2013) 111:135–145.