

Materials and Techniques of Anonymous Egyptian Polychrome Cartonnage Mummy Mask: A Multiple Analytical Study

Authors : Hanaa A. Al-Gaoudi, Hassan Ebeid

Abstract : The research investigates the materials and processes used in the manufacturing of an Egyptian polychrome cartonnage mummy mask with the aim of dating this object and establishing trade patterns of certain materials that were used and available at the time of ancient Egypt. This anonymous-source object was held in the basement storage of the Egyptian Museum in Cairo (EMC) and has never been on display. Furthermore, there is no information available regarding its owner, provenance, date, and even the time of its possession by the museum. Moreover, the object is in a very poor condition where almost two-thirds of the mask was bent and has never received any previous conservation treatment. This research has utilized well-established multi-analytical methods to identify the considerable diversity of materials that have been used in the manufacturing of this object. These methods include Computed Tomography Scan (CT scan) to acquire detailed pictures of the inside physical structure and condition of the bended layers. Dino-Lite portable digital microscope, scanning electron microscopy with energy dispersive X-ray spectrometer (SEM-EDX), and the non-invasive imaging technique of multispectral imaging (MSI) to obtain information about the physical characteristics and condition of the painted layers and to examine the microstructure of the materials. Portable XRF Spectrometer (PXRF) and X-Ray powder diffraction (XRD) to identify mineral phases and the bulk element composition in the gilded layer, ground, and pigments; Fourier-transform infrared (FTIR) to identify organic compounds and their molecular characterization; accelerator mass spectrometry (AMS 14C) to date the object. Preliminary results suggest that there are no human remains inside the object, and the textile support is linen fibres with tabby weave 1/1 and these fibres are in a very bad condition. Several pigments have been identified, such as Egyptian blue, Magnetite, Egyptian green frit, Hematite, Calcite, and Cinnabar; moreover, the gilded layers are pure gold and the binding media in the pigments is Arabic gum and animal glue in the textile support layer.

Keywords : analytical methods, Egyptian museum, mummy mask, pigments, textile

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