

Characterization of 19th century Daguerreotypes by nondestructive analytical techniques

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The Daguerreotype is considered by most of the historians of photography the first invented technique to produce a permanent image using a photochemical reaction. It was developed in France in the decade 1820-1830 by Louis Jacques Mandé Daguerre (1787-1851) and Joseph-Nicéphore Niépce (1765 – 1833). Daguerre presented this new photographic process to the *Académie des Sciences* de Paris in the session of 7th January 1839. In summary, the process involves the polishing of a silver-coated copper plate and its sensitization with chloride or iodine, exposure to sunlight followed by the image development with heated mercury. The image was then fixed with sodium thiosulfate and a positive photographic image was obtained.

In order to study the morphology and the degradation status of some daguerreotypes, Optical Microscopy (OM) and Variable Pressure Scanning Electron Microscopy (VP-SEM) techniques were used. Local chemical composition was evaluated by in-situ nondestructive spectroscopic techniques such as X-Ray Fluorescence Spectroscopy (XRF) and Energy Dispersive X-Ray Spectrometry (VP-SEM/EDS). This multianalytical approach includes important tools for the characterization of the daguerreotype process as well as for issues related to the restoration and conservation of historical photographic plates.

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