

OBJECT RESEARCH



Alfred Stieglitz (American, 1864–1946)

Georgia O'Keeffe

1918

Palladium print

Alfred Stieglitz Collection

AIC accession number: 1949.745A

Stieglitz Estate number: OK 19E

Inscriptions: Unmarked recto; inscribed verso, right center, in graphite: "Cream [diagonally] [arrow pointing right]"; verso, lower center, in graphite: "8 [?/sideways] / K later? / OK / 19E"

Dimensions: 24.1 x 19.3 cm (image); 25.1 x 20.1 cm (paper)

Print thickness: 0.297 mm

Surface sheen: Low gloss (10.2 GU @ 85°)

Paper tone: L*91.64, a*1.74, b*15.22

Mount: Unmounted

Mount tone: L*92.77, a*1.87, b*14.17

Ultraviolet-induced (UV) visible fluorescence (recto): None

X-ray fluorescence (XRF) spectrometry:
See below

Fourier transform infrared (FTIR) spectrometry:
See below

TECHNICAL SUMMARY

This photograph is a palladium print on a thin cream paper. The print is no longer adhered to its original mount. However, the mount, with evidence of adhesive from the original window mat, has been retained. The original window, now missing, would have masked the black margins showing the edge of the negative from contact printing. A notch code from the negative, specific to the manufacturer and the type of plastic base, is visible at the bottom of the image. The inscription "OK 19E," on the verso of the print, correlates to the estate or "Leica" number that Georgia O'Keeffe and Doris Bry assigned to mounted prints from the same negative that were in Stieglitz's possession at the time of his death. The inscription "Treated by Steichen 1949" was written on the original mat. After Stieglitz's death, Georgia O'Keeffe asked Edward Steichen to treat some of Stieglitz's photographs that had begun to yellow. This palladium print was among those he treated. Though Steichen never disclosed his treatment process, this print shows cracking of the image material in the midtone areas, a recurring problem with prints he treated. When the surface of the print is viewed under high magnification, the fibers from the paper are visible and the image sits directly on the fibers, with no intermediary binder. The print does not fluoresce when exposed to long-wave UV radiation. Palladium, iron, mercury, and gold were detected using XRF spectrometry. Common to palladiotypes, the residual presence of light-sensitive iron ions could be due to improper washing of the print after processing. The presence of mercury could be the result of the artist's use of mercuric chloride during processing, to create warm tones. The presence of gold could be the result of the artist's use of a gold chloride toner during processing, to create a pink or purple tint in the final print. FTIR analysis has confirmed the presence of a thin layer of organic wax over the surface of the print. After comparing this result to information found in some of Stieglitz's correspondence, it was determined that the coating on the print is likely a form of beeswax.

X-RAY FLUORESCENCE (XRF) SPECTROMETRY

XRF spectral readings were taken from the recto of the work and from the mount when available. The elements listed below have been positively identified in the work; elements in bold have been attributed to the processing of the print.

Print: **Fe, Pd**, Au, Hg

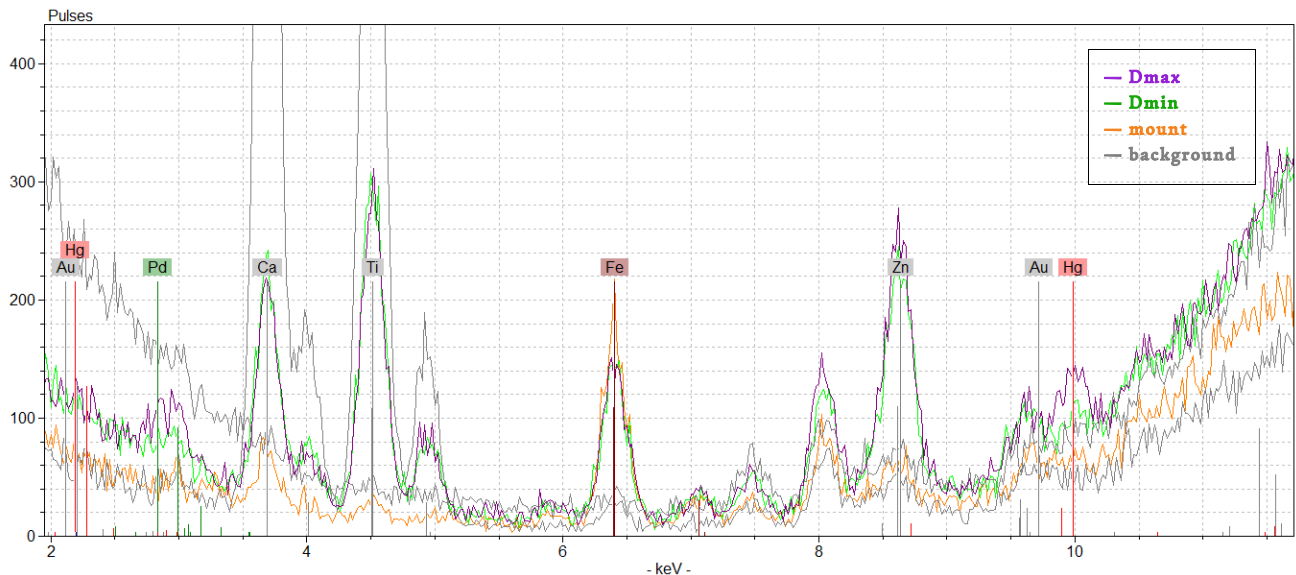
Mount: Ca, Ti, Fe, Zn, Sr

The graph below shows XRF spectra for three distinct measurement areas on the print: the darkest, maximum-density image area (Dmax, purple); the lightest, minimum-density image area (Dmin, green); and the mount, when available (orange). The background spectrum (gray) represents the characteristic contribution of the instrument itself as measured on a Teflon reference and is included in order to discount irrelevant elements from the print's signature. Elements were identified based on the presence of their characteristic peaks. Analysis was performed with a Bruker/Keymaster Tracer III-V+ energy-dispersive handheld XRF analyzer, equipped with changeable Ti and Al filters and a Rh transmission target. Measurements were taken for 120 or 180 LT at 40 kV and 10 µA. The spectrum below illustrates the significant peaks for this print in the energy range from 2 to 11 keV.

Figure 1. (right)
Locations of XRF measurements



Figure 2. (below)
XRF spectra from the Dmax, Dmin, mount,
and background signal produced by the
analyzer



FOURIER TRANSFORM INFRARED (FTIR) AND FT-RAMAN SPECTROSCOPY

Analysis was conducted using Attenuated Total Reflectance spectroscopy (FTIR-ATR). Strong peaks for wax were identified and wax was confirmed with FT-Raman analysis.

Analysis was performed using a Bruker tensor 27 FTIR spectrophotometer with mid-IR glowbar source coupled to Hyperion 2000 Automated FTIR microscope with nitrogen cooled MCT detector (covering the range 4,000- 450 cm^{-1}). Samples were analyzed using a germanium ATR attachment for the microscope, collecting 512 scans at a resolution of 4 cm^{-1} . FT-Raman spectroscopy was conducted in-situ using a Bruker Ramscope III FT-Raman Microscope and open architecture external arm adapted for the study of art objects (ArtArm). The instrument is equipped with a (D418-T/R) high-sensitivity Ge detector and Nd^{3+} /YAG laser, with excitation wavelength at 1064 nm. 1000 scans were accumulated three times and averaged, at 4 cm^{-1} resolution, using a 10x microscope objective with a nominal laser power of 100mW.

Figure 1. (right)
Location of the spot analyzed with FTIR-ATR
and FT-Raman spectroscopy



Figure 2. (below)
FTIR-ATR spectra taken in the background:
Sharp peaks for wax are visible (labeled 'w'
in the image). The spectrum is otherwise
dominated by the bands of the cellulose
substrate.

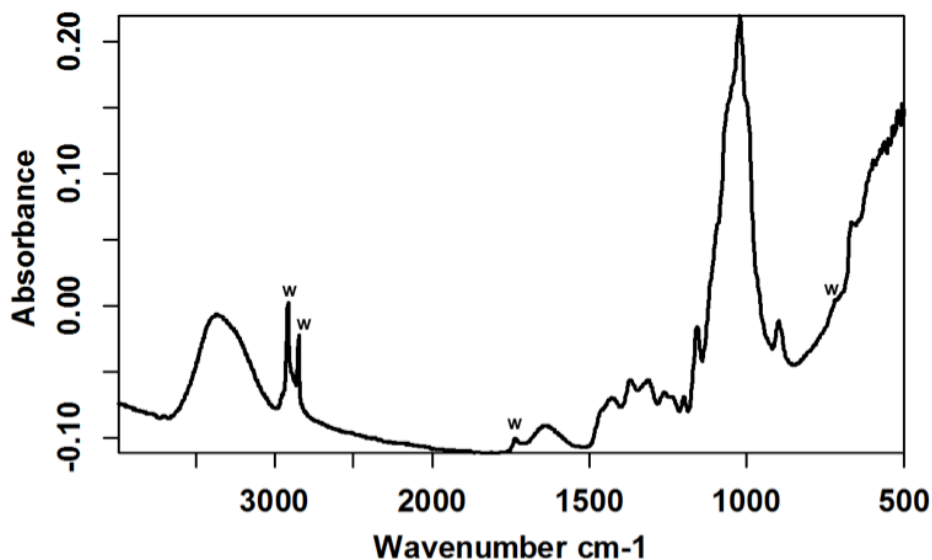


Figure 3. (below)

FT-Raman: (top black spectra) recorded on the photograph; (middle grey spectra) wax reference; (bottom black spectra) cellulose substrate reference

