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Abstract: The Effect of Environmental Pollutants on the Deterioration of the Daguerreotype Image

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The sensitivity of the daguerreotype image to light and environmental pollutants, such as sulfur- and chlorine-containing compounds, as well as to damage by mechanical and chemical cleaning, has been previously reported and discussed [1-3]. To further characterize the formation of deterioration products frequently found in historic and artistic plates, test samples prepared following 19th century daguerreotype recipes were exposed to either chlorine or sulfur-containing environments. Original daguerreotypes and the exposed samples were analyzed using Raman spectroscopy and ultra-high resolution SEM-EDS, and deterioration products, such as silver chloride, silver sulfide, and silver oxide, were identified and characterized by these techniques. To assess the photoreactivity of the deterioration products, laboratory samples exposed to pollutants were illuminated using a micro-fading tester and monitored by diffuse reflectance. The areas exposed to light were subsequently analyzed by Raman spectroscopy and SEM-EDS to evaluate the chemical and physical changes. The illumination tests confirmed that the deterioration is light sensitive. Additionally, results from a modified Oddy test on silver corrosion sensors recently developed to assess replacement daguerreotype housing materials will be reported.

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[3] Centeno, S.; Schulte, F.; Kennedy, N.; Schrott, A. Appl. Phys. A 2011, 105, 55.

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