



AUSTRALIAN INSTITUTE FOR THE CONSERVATION OF CULTURAL MATERIAL INC.

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Abstract

Title:

Comparing cleaning methods for cellulose nitrate: Study of the silicone solvent D4

Name of Presenter:

Samantha Owens

Name/s of All Co-authors:

Samantha Owens and Madeline Corona

Affiliations:

Winterthur/University of Delaware Program in Art Conservation

Abstract:

Cellulose nitrate is known to be adversely affected by both aqueous and solvent cleaning methods. New materials used in conservation, such as silicone solvents and silicone-based emulsions, offer promising possibilities for cleaning; however, their effect on cellulose nitrate and other similarly sensitive plastics has not been explored.

The lid from a 1920s cellulose nitrate hair receiver was cleaned with a variety of mixtures, and initial surface changes were observed and recorded. Acetone and benzyl alcohol, solvents known to be damaging, were included in the testing protocol as controls, along with water at a pH of 6 and 8, and Shellsol D-38. These were compared to octamethylcyclotetrasiloxane (a cyclomethicone silicone solvent, also known as D4). The object was artificially aged with a QUV Weatherometer, controlling light and temperature, in order to accelerate degradation.

After aging, the six solvents tested were applied directly to the surface and allowed to sit for 30 seconds before they were collected for GC-MS analysis to determine if any plasticizer was removed. Camphor was detected by GC-MS in all samples collected except for Shellsol D-38 and D4. This suggests that the silicone solvent will not remove or leach plasticizer from the cellulose nitrate surface, and should be explored further as a possible material for use with cellulose nitrate. Silicone gels, including the silicone crosspolymer gel Velvesil Plus, may also provide more options for bringing small amounts of cleaning solutions to the surface of plastics, as they can be emulsified with both water and solvents. Further research may allow for the development of custom cleaning systems for plastics that mitigate the risk of removing plasticizers.

Brief Biography of the Author(s):

Samantha Owens is completing her Master of Science degree at the Winterthur/University of Delaware Program in Art Conservation in the United States. She is currently in a year-long internship at the Metropolitan Museum of Art in New York, with a focus on the conservation of modern and contemporary objects.

E-mail contact:

owens.samantha@gmail.com