



BACK, NOW, AND THEN 2023

Understanding Dieter Roth's *POeMETRIE* series
& the Age of Plastics
bridging Science and Art

12.-13. October 2023
Academy of Fine Arts Vienna
Schillerplatz 3, 1010
Vienna Austria

Symposium Programme & Book of Abstracts

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& the Age of Plastics
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12.-13. October 2023

Academy of Fine Arts Vienna, Austria

Institute for Sciences and Technology in the Arts (INTK) &
Institute for Conservation Restoration (IKR),
Academy of Fine Arts Vienna, Austria

A...kademie der
bildenden Künste
Wien



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Andrea MACCHIA / *YOCOCU, Youth in Conservation of Cultural Heritage, Rome, Italy*

INVITED SPEAKERS

Yvonne SHASHOUA / *Environmental Archaeology and Materials Science, National Museum of Denmark, Denmark*

Tjasa RIAVEC & Matija STRLIC / *University of Ljubljana, Faculty of Chemistry and Chemical Technology, Slovenia*

Ina JESSEN / *Dieter Roth Hamburg Foundation, Germany*

Claartje VAN HAAFTEN / *Deutsches Historisches Museum (DHM), Berlin, Germany*

Paula GASSMANN / *Institute for Conservation-Restoration (IKR), Academy of Fine Arts Vienna, Austria*

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Sonja ALHÄUSER / *Artist, Germany*

SYMPOSIUM

The **aim** of this event is to **bring together** national and international professionals from **different disciplines** for the first time, such as the artists and scientists from **conservation laboratories** who work **with modern and contemporary art** to focus on the **challenges** related to art in the **Age of Plastics**, guided by a focus on the **POeMETRIE** series of **Dieter Roth**. We will examine and discuss the issues these works face, their relevance to plastic heritage in general, and how they reflect the evolution of the development of plastics.

The **2-day symposium** will take place in presence; this call intends to encourage proposals for oral and poster presentations that would deepen the understanding of the following subjects:

- **Comprehension of materials** and techniques involving plastic-based artistic objects, in particular the *POeMETRIE* series of Dieter Roth.
- **Ageing and Degradation** mechanisms and conservation strategies for plastics in museum collections.
- Plastic and technological **development**.



Photo: Detail of *POeMETRIE* (1968) by Dieter Roth: strongly deformed plastic bags. Mag. Art. P. Gassmann

VENUE

AULA, ACADEMY OF FINE ARTS VIENNA

With the unique architecture of the house built by Theophil Hansen on Schillerplatz, the Academy of Fine Arts Vienna offers an impressive historical setting and an unforgettable ambience. The building shines in new splendour after its general renovation since October 2021.

The Aula on the first floor offers the perfect setting for the symposium. A special highlight for everyone could also be a visit to the Paintings Gallery with its masterpieces such as the *Last Judgment* Triptych by Hieronymus Bosch (1450/55-1516).



SOCIAL EVENT

Paintings Gallery of the Academy of Fine Arts Vienna,

Thursday 12. October 2023 – 16:00-18:00

Well known for hosting outstanding works by Dutch and Flemish painters of the 17th century (including Rubens, Rembrandt and van Dyck) as well as the famous *Last Judgment* altar by Hieronymus Bosch, the Paintings Gallery of the Academy of Fine Arts Vienna houses a total of 1,600 works, dating from the 14th century, also including modern and contemporary art pieces.



SOCIAL DINNER

Restaurant Glacis Beisl

Thursday 12. October 2023 – 19:00 -

In the 7th district of Vienna, nestled between the Volkstheater, Spittelberg, Mariahilferstrasse and the Museumsquartier, the Glacis Beisl is a refuge for everyone who needs a little distance from the hustle and bustle of the city.

A symbiosis of modernity and tradition awaits you here. Classic Viennese cuisine, wonderful wines, a wonderful garden and a cosy dining room, where a wonderful aroma of fine dishes awaits you.

Date: Thursday, 12/Oct/2023

8:00am - 9:00am	R: Registration
9:00am	1MS: 1st Morning Session Session Chair: Carolin Bohlmann
9:00am - 9:30am	Op: Opening Rector Johan Hartle, Carolin Bohlmann, Katja Sterflinger, Valentina Pintus
9:30am - 10:00am	K1: Keynote speaker 1 Ina Jessen (Dieter Roth Hamburg Foundation, DE) POeMETRIE. The Luxury Edition in Dieter Roth's Artist's Book Oeuvre
10:00am - 10:20am	O1: Oral presentation 1 Felicitas Thun-Hohenstein (Academy of Fine Arts Vienna, AT) Book. Container. Accumulation. Performative Aspects in the Work of Dieter Roth
10:20am - 10:40am	O2: Oral presentation 2 Maria Kokkori (Northwestern University, US) On "decay objects": Dieter Roth's Taschenzimmer (Pocket Room)
10:40am - 10:50am	CD1: Collective Discussion 1
10:50am - 11:20am	C1: 1st Coffee Break and Poster Session
11:20am	2MS: 2nd Morning Session Session Chair: Valentina Pintus
11:20am - 11:50am	K2: Keynote speaker 2 Sonja Alhäuser (Artist, DE) The Never-ending Work: Material Transformation in Drawings and Sculptures
11:50am - 12:10pm	O3: Oral presentation 3 Carolin Bohlmann (Academy of Fine Arts Vienna, AT) Collaboration as Conservation: Following Dieter Roth's Artistic Production
12:10pm - 12:40pm	K3: Keynote speaker 3 Maria Loerzel (LVR-Landschaftsverband Rheinland, Amt für Denkmalpflege, DE) Plastics and Conservation Ethics using the example of the Transparent Figures
12:40pm - 12:50pm	CD2: Collective Discussion 2
12:50pm - 2:00pm	L1: Lunch 1st Day
2:00pm	1AS: 1st Afternoon Session Session Chair: Ina Jessen
2:00pm - 2:30pm	K4: Keynote speaker 4 Claartje van Haften (Deutsches Historisches Museum (DHM), DE) Plastics. We Think We Know Them, But Do We Really?
2:30pm - 2:50pm	O4: Oral presentation 4 Mary Coughlin (George Washington University, US) Low-tech, Low-cost Monitoring of Plasticized PVC
2:50pm - 3:10pm	O5: Oral presentation 5 Livia Marinelli (Sapienza University of Rome, IT) Mattel's Barbie: Conserving the Materiality of a Symbol. Film-forming Innovative Formulations for Plasticizers Leakage Prevention
3:10pm - 3:20pm	CD3: Collective Discussion 3
3:20pm - 4:00pm	C2: 2nd Coffee Break and Poster Session
4:00pm - 6:00pm	SE: Social Event Visit to the Paintings Gallery of the Academy of Fine Arts Vienna
7:00pm - 11:00pm	SD: Social Dinner Dinner at Glacis Beisl

Date: Friday, 13/Oct/2023

9:00am	3MS: 3rd Morning Session Session Chair: Mary Coughlin
9:00am - 9:30am	K5: Keynote speaker 5 Yvonne Shashoua (National Museum of Denmark, DK) The Legacy of the Plastics Age
9:30am - 9:50am	O6: Oral presentation 6 Marisa Pamplona (Deutsches Museum, DE) Synthetic polymers in technical heritage: research on robotic, airspace and aviation collections
9:50am - 10:10am	O7: Oral presentation 7 Christina Elsässer (Deutsches Museum, DE) Celluloid 3D-Objects: Are They Safe in A Frozen Storage Condition?
10:10am - 10:20am	CD4: Collective Discussion 4
10:20am - 10:50am	3rd Coffee: 3rd Coffee Break and Poster Session
10:50am	4MS: 4th Morning Session Session Chair: Yvonne Shashoua
10:50am - 11:20am	K6: Keynote speaker 6 Paula Gassmann (Academy of Fine Arts Vienna, AT) Towards the Understanding of PVC and Minced Mutton Meat - the Ageing Behaviour in an Artwork by Dieter Roth
11:20am - 11:50am	K7: Keynote speaker 7 Tjasa Rijavec (University of Ljubljana, Faculty of Chemistry and Chemical Technology, SI) PVC: Modelling of Decay Processes for Improved Preventive Conservation
11:50am - 12:10pm	O8: Oral presentation 8 Francesca Izzo (Ca' Foscari University of Venice, IT) Animation Cels Unveiled: Degradation Problems of Cellulose Acetate and Nitrate-Based Materials for the Italian TV Animation Between the 1950s and the 1970s
12:10pm - 12:20pm	CD5: Collective Discussion 5
12:20pm - 2:00pm	L2: Lunch 2nd Day
2:00pm	2AS: 2nd Afternoon Session Session Chair: Francesca Caterina Izzo
2:00pm - 2:30pm	K8: Keynote speaker 8 Elena Gómez Sánchez (Deutsches Bergbau-Museum Bochum, Materials Science DE). Identifying, Prioritising, Preventing. Current Research Efforts Against the Degradation of Polymeric Materials from The Deutsches Bergbau-Museum Bochum
2:30pm - 2:50pm	O9: Oral presentation 9 Aleksandra Papis (Auschwitz Birkenau State Muzeum, PL) Conservation Challenges of Plastic Objects in the PMA-B Collection
2:50pm - 3:10pm	O10: Oral presentation 10 Gunnison Anne (Yale University Art Gallery, US) Characterizing Polycaprolactone in Work by Matthew Barney
3:10pm - 3:20pm	CD6: Collective Discussion 6
3:20pm - 3:30pm	SS: Symposium Summary
3:30pm - 4:00pm	C4: Farewell Coffee and Poster Session
4:00pm - 5:00pm	Organizer's Meeting: Organizer's and Committee Meeting

POSTERS

P01	Kim Alice Jacqueline Goldsmith (National Gallery of Australia, AU) Perpetual Plastics: Conserving Artistic Intent in Polymer-Based Objects from the National Gallery of Australia
P02	Taylor Hinojosa-Hayes (Academy of Fine Arts Vienna, AT) The PVC Bodies of Kiki Kogelnik
P03	Sophie Benhart (Academy of Fine Arts Vienna, AT) Alain Jacquet and the restoration of inflatable objects made of PVC-P - an approach

ABSTRACTS

Presentations

K1: Keynote speaker 1

Time: Thursday, 12/Oct/2023: 9:30am - 10:00am

POeMETRIE. The Luxury Edition in Dieter Roth's Artist's Book Oeuvre

Ina Jessen

Dieter Roth Hamburg Foundation, Germany; kontakt@inajessen.de

Keywords: Dieter Roth, Poeterei, restoration, organic materials

Preferential editions play an important role in Dieter Roth's work. The poetry volumes of "Poeterei" and their series as deluxe editions captivate with manifold transformative materials such as chocolate, a lunch (e.g., lamb chops and mashed potatoes), or even urine. In terms of both material iconography and real material processes, these artist's books in Roth's oeuvre thus pose a challenge for various fields of activity and employment. This applies to art and cultural history as well as to practical questions of restoration science, including the perception of the book objects. This art historical contribution focuses on the preferred editions of the "Poeterei" - the "POeMETRIE" - and places them in the context of other artist books by Dieter Roth and offers an overview of the multi-sensory perceptible editions with their different organic materials.

O1: Oral presentation 1

Time: Thursday, 12/Oct/2023: 10:00am - 10:20am

Book. Container. Accumulation.

Performative Aspects in the Work of Dieter Roth

Felicitas Thun-Hohenstein

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Keywords: Book, Dieter Roth, performative, artistic oeuvre

This work attempts to propose a performative view of the overall structure of Dieter Roth's artistic oeuvre, which is connected in networks of relationships. Following his "dictum" from around 1960, in which the artist puts the element of "quantity" before that of "quality" in his work, narration and performance are at the centre of this work considerations.

O2: Oral presentation 2

Time: Thursday, 12/Oct/2023: 10:20am - 10:40am

On “decay objects”: Dieter Roth’s *Taschenzimmer* (Pocket Room)

Maria Kokkori¹, Hortense de La Codre¹

¹Northwestern University, United States of America; maria.kokkori1@northwestern.edu

Keywords: Dieter Roth, Pocket Room, plastics, bananas, degradation

In the late 1960s, Dieter Roth used plastics and banana slices as actual materials for his unique body of work known as *Taschenzimmer* (*Pocket Room*). Roth’s *Pocket Room* consists of a slice of banana pressed onto a card that is rubber-stamped with the image of a table, enclosed in a small plastic box measuring 7x10 cm, designed to fit into one’s pocket. Over time, the banana slices have naturally decayed and molded, resulting in distinctive decay patterns for each individual work, making each multiple in the edition unique. One of these multiples is in the holdings of the Northwestern University Library archival collection.

Roth’s *Pocket Room* with its plastics and foodstuffs, foregrounds physicality and materiality, providing a unique opportunity to explore questions of making and meaning: why materials matter and how they signify. This paper presents the results of an interdisciplinary study of Roth’s plastics that brings together curatorial, conservation and material science expertise and discusses how new material knowledge can enrich our understanding of an object’s biography. Employing this project as a reference point, this paper explores how scientific analysis of plastics is impacting and shaping the future of a collection, the challenges we face when collecting and caring for works on non-traditional materials, discussing issues in storing and preserving these materials and illustrating broader challenges in collection care and stewardship.

K2: Keynote speaker 2

Time: Thursday, 12/Oct/2023: 11:20pm - 11:50pm

The Never-ending Work: Material Transformation in Drawings and Sculptures

Sonja Alhäuser

Artist, Germany; sonja-alhaeuser@web.de

Keywords: Sculptures, Dieter Roth, Artist, Ephemeral, Materials

I place a selection of my sculptures and pictorial drawings parallel to works by Dieter Roth and would like to attempt to speak about the longevity of the ephemeral and momentary.

My fascination for the works of Dieter Roth lies not only in individual pieces of art themselves but especially in the connection of all works with each other and the processuality that can be experienced, which runs through his oeuvre.

By the choice of his materials but also by the way of the reworkings in the paper works a constant transformation is work-immanent and I feel it as infinite. At this point the question of the way of restoration comes up from an artistic point of view.

As an artist who herself creates works with an expiration date,

It is important and interesting to consider what possibilities there are on the part of the restoration to maintain the aspect of the processual in the works or to discuss to what extent and in what form a restorative intervention happens and what it ultimately means for the artistic work.

O3: Oral presentation 3

Time: Thursday, 12/Oct/2023: 11:50am - 12:10am

Collaboration as Conservation: Following Dieter Roth's Artistic Production

Carolin Bohlmann

Institute for Conservation-Restoration, Modern-Contemporary Art, Academy of Fine Arts Vienna, Austria; c.bohlmann@akbild.ac.at

Keywords: Dieter Roth, Collaboration, Conservation, Practice, Organic Materials

Dieter Roth established "collaboration" as a principle of his artistic production. The lecture aims to elaborate on this notion of collaboration as a museum and conservation practice. The current conference outlines the broad field of conservation-restoration and locates the tasks between aesthetics, ethics, material knowledge, chemistry, physics, hermeneutics and art politics. The handling of processual and possibly participatory works can therefore only be accomplished by cooperation - and can only succeed with the involvement and negotiation of the various human and non-human actors concerned.

Organic materials, obsolete technologies, object contingency, and human interactivity embedded in contemporary art therefore force the museum institution to develop new processes of collection management and exhibition practices. These practices include the use of new methods for documenting, storing, and exhibiting variable media. It is a matter of accepting that one cannot do justice to the works of Dieter Roth with categories of objecthood and closedness. Restorers are not the only co-workers of Dieter Roth's works in the museum. The spectrum of stakeholders is manifold: the curators and restorers are joined by the coughs of the visitors, the birds, and later perhaps also the beetles, and they all guarantee a never completed recording, collecting, and disposal.

K3: Keynote speaker 3

Time: Thursday, 12/Oct/2023: 12:10pm - 12:40pm

Plastics and Conservation Ethics using the example of the Transparent Figures

Maria Lörzel

LVR-Landschaftsverband Rheinland, Amt für Denkmalpflege, Germany; Maria.loerzel@lvr.de

Keywords: Ethics, Transparent Figures, Decision Making, Plastics, Conservation Concept

The ethics of conservation methods should be considered heavily in the decision-making process. This includes topics such as reversibility, impact of conservation materials, artist intentions or the intended use, or the changes to the authenticity or originality of the object.

With plastic or modern materials in general we are confronted with a significantly lower life span compared to traditional materials. The artists, producers and original users of these objects are still alive and may be at odds with the conservation goals or methods we are used to. In general, people struggle to value aged plastics in a way they do – for example – aged wood or stone. At the same time, a lot of desired functions of plastics can be impacted very quickly by use and ageing and can impair their useability.

These aspects lead to a high number of conflicts arising in a comparable short amount of time. We must ask ourselves, in which way we can or want to keep the original materials without infringing on the other values of our objects as art or cultural artifacts.

On the case study of the Transparent Figures, anatomical models made by the German Hygiene-Museum in Dresden between 1930 and 2000, a tool was developed which shows the impact of material changes on the values of the figure. While not easily transferable, it seeks to provide insight to the connection of material and the intangible in complicated objects.

K4: Keynote speaker 4

Time: Thursday, 12/Oct/2023: 2:00pm - 2:30pm

Plastics. We Think We Know Them, But Do We Really?

Claartje van Haaften

Deutsches Historisches Museum, Germany; van_haaften@dhm.de

Keywords: Collecting Plastics, Conservation, Synthetic Materials

Drawing on the rich collection of the German Historical Museum (DHM), this presentation traverses the 20th century 'Age of Plastics', exploring how plastics have intertwined with human culture, science and art. Plastics have captured the imagination of journalists, engineers, designers, philosophers and activists alike, becoming a subject of fascination and debate. The objects in the collection reflect our society outside the museum. Meanwhile, they showcase an astonishing variety of synthetic polymers, each with its own unique properties and challenges. From vintage Bakelite radios to contemporary 3D printed creations, plastics come in a myriad of forms and functions. At the DHM, the plastic objects - whether they remain in storage, are transported, exhibited or loaned out - are looked after by a conservator, whose expertise enables the assessment of their condition and how to treat them. The lecture culminates in the paradox of plastics - we think we know them, yet their complexity remains largely unexplored. Understanding their chemical composition, manufacturing processes, molecular structures and interactions with other materials, as well as impact from the environment is crucial. Conservation strategies for plastic artefacts in our collection therefore rely on research and cooperation with scientists to ensure their long-term preservation.

O4: Oral presentation 4

Time: Thursday, 12/Oct/2023: 2:30pm - 2:50pm

Low-tech, Low-cost Monitoring of Plasticized PVC

Mary Coughlin

George Washington University, United States of America; coughlin@gwu.edu

Keywords: PVC, plastic, polymer, degradation, monitor

Since the 1950s Polyvinyl chloride or PVC has been one of the most prevalent plastics in the world and as a result of its mass production and popularity is found in nearly all museum collections in some capacity. The degradation of plasticized flexible PVC is generally marked by weeping, tackiness, and eventual embrittlement as plasticizers are lost from the polymer matrix. These visible indicators of deterioration are obvious but is there an accessible, affordable way to flag when plasticized PVC is further on its degradation pathway but not yet showing these telltale signs? If so, what could this mean for storage, display, and lending decisions? Knowing that most museums do not have access to conservation laboratories, non-invasive commercially available methods were tested on known PVC samples: Acid-Detecting (A-D) strips, copper coupons, and Ozone Test strips, a product marketed for the detection of ozone that can get a false positive when exposed to oxidants such as chlorine. There were promising results in using these products to monitor small PVC objects. In two cases, FTIR analysis indicated that the PVC samples were degrading but the objects looked fine. The A-D strip for only one of these reacted but both got a positive reaction with Ozone Test strips, indicating that these may have potential to serve as an easy-to-use, affordable monitor to flag PVC degradation before noticeable signs of deterioration.

O5: Oral presentation 5

Time: Thursday, 12/Oct/2023: 2:50pm - 3:10pm

Mattel's Barbie: Conserving the Materiality of a Symbol. Film-forming Innovative Formulations for Plasticizers Leakage Prevention.

Andrea Macchia^{1,2}, Livia Marinelli^{1,3}, Francesca Irene Barbaccia^{1,4}, Alice Hansen⁵

¹YOCOCU, Youth in Conservation of Cultural Heritage, Rome, Italy; ²Department of Biology, Ecology and Earth Sciences DIBEST, University of Calabria, Arcavacata, Rende, Italy; ³Department of Antiquities, Sapienza University of Rome, Italy; ⁴Department of Engineering, International Telematic University UniNettuno, Rome, Italy; ⁵PLART Foundation, Naples, Italy;
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Keywords: Barbie, coating, conservation, plastics, plasticizer, PVC

The present study is aimed to identify a film-forming green coating, suitable for the application on Polyvinyl Chloride (PVC) substrates in order to prevent the superficial leakage of plasticizers.

Indeed, PVC is known for being affected by a degradation mechanism which involves the migration of plasticizers from the bulk to the external layers of the plastic. The formation of a glossy superficial exudate in association with a general loss of elasticity is among the most significant effects of the mentioned process, which causes remarkable modifications on optical and mechanical properties of PVC.

The research represents the prosecution of a first investigation¹ carried out for the characterization of constitutive materials and degradation mechanisms on Mattel's Barbie dolls. After the initial findings, this study was set up to evaluate the features of a rose of innovative coatings formulations, exploring their film-forming properties before and after artificial by digital microscopy, FT-IR spectroscopy, Fiber Optics Reflectance Spectroscopy and SEM analysis. Furthermore, biological contamination tests were executed to evaluate the sensibility of the formulations to biodeterioration.

As a result of the multi-analytical survey, the correlation of the obtained results led to the identification of a proper coating formulation to be applied on PVC substrates as superficial protection, allowing the protection and the conservation of Mattel's Barbie.

[1] A. Macchia et al. *Polymers* **2022**, *14*(20), 4287; <https://doi.org/10.3390/polym14204287>

K5: Keynote speaker 5

Time: Friday, 13/Oct/2023: 9:00am - 9:30am

The Legacy of The Plastics Age

Yvonne Shashoua

National Museum of Denmark, Denmark; Yvonne.Shashoua@natmus.dk

Keywords: plastics, lifetimes, degradation, conservation, PVC

When synthetic plastics were first widely available in the 1950s, they were considered unique and everlasting materials. However, the impacts of plastics on our society have been both positive and negative. While plastics in designs, artworks, medicine and space travel have greatly improved the quality of our lives, pollution from degradation of plastics has had the opposite effect. Published studies based on accelerated ageing to predict the lifetime of plastics products, suggest that they fragment to microplastics (< 5mm) after thousands of years. However, the first commercial plastics became available in the 1950s, museums became aware of degradation in the 1980s and the first microplastics were detected in 2004, a maximum of 50-60 years. Research by the speaker has identified chemical and physical markers that define the rate of degradation in plastic artworks, objects and in litter in real time, using FTIR spectroscopy to identify chemical changes in polymers component and GC-MS to follow loss of additives. The results suggest significantly shorter lifetimes for plastics than current predictions. The major factors that cause degradation in plastics, with special focus on PVC and polyurethane foams will be detailed. Techniques will be presented by which we can slow the chemical and physical processes and thereby extend the lifetimes of these materials far beyond the Plastics Age.

O6: Oral presentation 6

Time: Friday, 13/Oct/2023: 9:30am - 9:50am

Synthetic polymers in technical heritage: research on robotic, airspace and aviation collections

Marisa Pamplona

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Keywords: PUR, PA, rubber, cellulose nitrate, chemical analysis

Synthetic polymers are present in ca. 38.000 objects of the Deutsches Museum, demonstrating their relevance in technological heritage throughout several collections. This presentation is dedicated to illustrate a few case studies of this vast research field.

Motivated by the modernization of permanent exhibitions that reopened in summer 2022, the Conservation Science Department supported the curators of robotic [1], airspace [2] and aviation [3] collections in: i) understanding the causes of deterioration of some synthetic polymers (e.g. PUR, PA and rubbers) and minimize their effects in the new exhibitions; ii) understanding the past history of objects (e.g. airplane paint layers).

Material analyses of modern materials were performed on elastomers, thermoplastics and paint binders by multianalytical approaches, which combined mainly microscopy with spectroscopy and mass spectrometry techniques. Our team collaborated with guest-researchers in the museum (scholar-in-residence programme) and with researchers from national and international universities.

[1] A. Micheluz et al. *Heritage Science* **2022**, 10(4); <https://doi.org/10.1186/s40494-021-00636-8>

[2] C. Holzer et. Al. In *Semi-synthetic and Synthetic Textile Materials in Fashion, Design and Art Joint Interim Meeting of ICOM-CC Modern Materials & Contemporary Art and Textiles Working Groups*. ***In print***.

[3] J. La Nasa et. al. *Journal of Analytical and Applied Pyrolysis* **2022**, 163, 105468; <https://doi.org/10.1016/j.jaap.2022.105468>

O7: Oral presentation 7

Time: Friday, 13/Oct/2023: 9:50am - 10:10am

Celluloid 3D-Objects: Are They Safe in a Frozen Storage Condition?

Christina Elsässer^{1,2}, Marisa Pamplona¹, Christian Grosse²

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Keywords: celluloid 3D objects, low-temperature storage, chemical analysis

In a research project of the Deutsches Museum the effect of room temperature, cool, cold, and frozen storage conditions to preserve unstable three-dimensional celluloid objects (3DCN) was investigated by chemical methods. The project included: i) the production of 3D-CN mock-ups [1]; ii) the selection and optimization of chemical characterization methods [2,3]; iii) the artificial aging of mock-ups to simulate degraded museum objects [1]; iv) the assessment of the effect of 7 months storage at -15 °C, $+5$ °C, $+13$ °C, and $+21$ °C. The results proved that -15 °C induced the best preservation, i.e., less main polymer chain scissions and camphor losses. Analytically it is recommended to check if 3D-CN already developed degradation gradients in profile [4], even if visually, no gradient is recognizable by the naked eye. Indeed, this study required a precise sampling of 3D CN in depth ($> 0,5$ mm thickness) to follow the degradation evolution of the tested conditions. Institutions with precious 3D-CN artefacts may consider freezing temperatures for their safe chemical preservation.

[1] C. Elsässer et al. *Polymers* **2023**, *15*(4), 852; DOI: 10.3390/polym15040852

[2] C. Elsässer et al. *Journal of Applied Polymer Science* **2021**, *138*, 50477; DOI:10.1002/app.50477

[3] S. Kavda et al. *Journal of Separation Science* **2021**, *44*, 1795–1804; DOI: 10.1002/jssc.202001018

[4] M.V. Chavez Lozano et al. *Polymers* **2023**, *15*(3), 522; DOI: 10.3390/polym15030522

K6: Keynote speaker 6

Time: Friday, 13/Oct/2023: 10:50am - 11:20am

Towards the Understanding of PVC and Minced Mutton Meat - the Ageing Behaviour in an Artwork by Dieter Roth

Paula Gassmann

Academy of Fine Arts Vienna, Austria; paula.gassmann@outlook.com

Keywords: Dieter Roth, p-PVC, plasticizer migration, meat fat, cleaning

Based on a copy of Dieter Roth's multiple POEMETRIE (1968) investigations were carried out in order to develop a cleaning concept that takes into account both the artistic intention and the specific material conditions. The artwork itself is a book-object, made of a translucent p-PVC plate as a book cover and transparent p-PVC bags as pages. Text is printed on the outside of the bags, while the bags themselves are stuffed with minced mutton. Plasticizer migration, fat diffusion, and leakage led to the formation of a sticky brownish surface layer, which was bringing the text at massive risk of being lost.

The first part of this work deals with the artist, his oeuvre, and the intention behind the artwork, while the second part focuses on a detailed description of the artwork's condition, the characterization of the degradation phenomena, as well as material analyses. In the third part of this work, several test series were established on mock-ups, to gain a better understanding of the materiality of the object. Additionally, possible cleaning options are discussed. For the examination of the artwork as well as for the testing series, a multi-analytical approach was established, incl. optical methods like UV/VIS imaging and microscopy, pH measurements, FTIR-ATR, and Py-GC/MS analysis, and weighting of the samples. Finally, the results of the testing series were used to establish a cleaning concept, which could be successfully applied to the artwork and for future reference.

K7: Keynote speaker 7

Time: Friday, 13/Oct/2023: 11:20am - 11:50am

PVC: Modelling of Decay Processes for Improved Preventive Conservation

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Keywords: Poly(vinyl chloride), Damage Function, Degradation, Polymer Stability, Heritage Science

Poly(vinyl chloride) (PVC) is a versatile material prevalent in consumer products and contemporary art and design, that presents unique challenges in heritage collections. The polymer's instability leads to an elimination of hydrogen chloride, causing yellowing through polyene sequence formation. Plasticizers are common additives that impart PVC with the required flexibility but may migrate or evaporate [1]. Understanding these degradation mechanisms is crucial, considering the various potentially synergistic pathways PVC may undergo. By exploring environmental factors and material characteristics, we observe how PVC degradation impacts material stability and appearance by using spectroscopy, chromatography and mechanical testing. Accelerated degradation of reference collection samples was used to evaluate the changes in the properties and to enable the modelling of degradation using empirical and theoretical approaches [2]. We have shown that the lifetime of transparent PVC objects (defined as acceptable yellowing) can be predicted based on temperature, relative humidity, plasticizer content, and molecular weight [3]. With a focus on mitigating the degradation, our goal is to ensure the long-term preservation of PVC objects.

[1] T. Rijavec, et al. *Acta Chimica Slovenica* **2020**, 67, 993–1013; DOI: 10.17344/acsi.2020.6479

[2] T. Rijavec et al. *Scientific Reports* **2022**, 12, 5017, 1–11; <https://doi.org/10.1038/s41598-022-08862-1>

[3] T. Rijavec et al. *Polymer Degradation and Stability* **2023**, 211, 110329; <https://doi.org/10.1016/j.polymdegradstab.2023.110329>

O8: Oral presentation 8

Time: Friday, 13/Oct/2023: 11:50am - 12:10pm

Animation Cels Unveiled: Degradation Problems of Cellulose Acetate and Nitrate-Based Materials for the Italian TV Animation Between the 1950s and the 1970s

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Keywords: Animation cels, Cellulose Acetate, Cellulose Nitrate, Rodovetri, Degradation

This contribution reports on the experience gained over a decade of studying and characterising a large number of Rodovetri, animation cels created for Italian TV in the 1950s-70s and conserved at the Museum of Industry and Labour 'Musil' (Italy). Thanks to numerous analytical studies using non-invasive and micro-invasive techniques, it has been possible for the first time ever to discover the materiality of the Rodovetri, both for the plastic support and the decoration of the characters (which was made entirely by hand, thanks to craftsmen so skilled as to merit the praise of Walt Disney himself). These animation cels, either nitrate-based or cellulose acetate-based, were initially hand-painted with a special painting medium created ad hoc with a mixture of vegetable gums and animal glue; then over the years, they were prepared with alkyd or acrylic-based binders.

As is well known, nitrate and cellulose acetate are subject to the so-called phenomena of denitration and deacetylation, which, in the case of decorated transparent sheets such as the Rodovetri, can lead to serious conservation problems for both the plastic sheet and the illustration on it. Unfortunately, this degradation is almost irreversible, only slowed down by preventive conservation. The research, therefore, also aimed to understand better the degradation phenomena that can be found in animation cels and provide significant issues on preventive strategies for the preservation of this 'plastic' heritage.

K8: Keynote speaker 8

Time: Friday, 13/Oct/2023: 2:00pm - 2:30pm

Identifying, Prioritising, Preventing. Current Research Efforts Against the Degradation of Polymeric Materials from The Deutsches Bergbau-Museum Bochum

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Keywords: Deutsches Bergbau-Museum Bochum, Polymeric Materials, Challenges, Ageing Plastics

Museum objects with parts or completely made of polymeric components are a challenge for museum professionals. Not only conservators and conservation scientists, but also curators and museum directors are confronted with the manifold changes this material group undergoes as degradation progresses. That means that, at some point of other of our professional lives, we all have to deal with the loss of Cultural Heritage and its consequences for the public. The Deutsches Bergbau-Museum Bochum, a museum located in the Ruhr area and focused on the Industrial Heritage of Mining, is no exception on this. When faced with this situation in a context of scarce resources, as is usually the case, the questions arise, how to prioritise efforts and which solutions can be implemented in practice. In this talk, current research efforts to address these challenges in our museum will be briefly outlined. Among these are: a) tools developed for the management of ageing plastics in our collections (atlas of ageing phenomena, survey database), b) the search for specific sorbents for the storage of so-called malignant plastics, and c) the study of the degradation phenomena of polyester urethane closed-cell foams, one of the most endangered materials in Industrial Heritage collections.

O9: Oral presentation 9

Time: Friday, 13/Oct/2023: 2:30pm - 2:50pm

Conservation Challenges of Plastic Objects in the PMA-B Collection

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Keywords: plastics, checking the condition of objects, mass-objects

Plastic objects in the PMA-B collection span from individual to mass-produced items, encompassing everyday articles such as suitcases, shoes, brushes, combs, and buttons [1]. The predominant plastics include cellulose nitrate, cellulose acetate, rubber, and fibre. A considerable portion of these objects is in a degraded state. Many items were mass-produced, extensively utilized by their owners, confiscated in the camp, and subjected to outdoor storage, often deliberately damaged. The initial museum exhibitions effectively conveyed the magnitude of the horrors witnessed in Auschwitz. To document the Nazi crimes, it is crucial to present each artefact as evidence. The process involves identifying layers from the camp's operational period, documenting deformations, potential transformations, and assessing their impact on the objects. Primary challenges involve assessing the condition of individual and mass objects and implementing preservation measures, such as optimizing storage conditions, to mitigate degradation [2].

[1] A. Papis et al. *To preserve authenticity: the conservation of museum collections and archival materials*, Oświęcim 2021. ISBN:978-83-7704-360-8

[2] A. Papis et al. Masse-Unikate-Dokumente 6000 Zahnbursten im Staatlichen Museum Auschwitz-Birkenau; in: ZKK Zeitschrift für Kunsttechnologie und Konservierung, 34. Jahrgang 2021, Heft 1. ISSN 0931-7198

O10: Oral presentation 10

Time: Friday, 13/Oct/2023: 2:50pm - 3:10pm

Characterizing Polycaprolactone in Work by Matthew Barney

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Keywords: Polycaprolactone, PCL, Matthew Barney

Polycaprolactone (PCL) is a semi-crystalline polyester, with a low melting point of 60°C. Because it is slowly biodegradable in the presence of water, PCL is used for sutures, tissue engineering scaffolds and drug delivery systems. Since the 1990s, artist Matthew Barney has used PCL as a medium for sculpture because of its relative ease of use in casting, as well as its aesthetic qualities. Fabricators from the Matthew Barney Studio, a conservator from the Yale University Art Gallery, and researchers in the Department of Biomedical Engineering at Yale University, who study PCL in the context of drug delivery and tissue engineering, have been working to better understand the aging and degradation mechanisms of PCL as it relates to the artist's work in museum and private collections. We have been particularly interested in learning if how PCL is heated, cast, and cooled has an impact on its long-term stability. Aged PCL samples from older sculpture and new samples which had been heated and cooled by a variety of methods were analysed with Size Exclusion Chromatography (SEC) to study changes in polymer molecular weight and Differential Scanning Calorimetry (DSC) to understand the degree of crystallization of PCL and how that might change with history of heating. Questions about the suitability of continued use of PCL as a medium for sculpture, and approaches to the conservation of aged sculptures, will be discussed.

P1: Poster presentation 1

Time: Thursday, 12/Oct/2023 & Friday, 13/Oct/2023: Coffee Break Time

Perpetual Plastics: Conserving Artistic Intent in Polymer-Based Objects from the National Gallery of Australia

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Keywords: Plastic Art Objects, Plastic Conservation

This poster presentation will address the importance of capturing the artist's attitudes towards change and decay when conserving polymer-based objects. It will use case studies from the National Gallery of Australia's collection. With the short life span of many polymers, the conservator must consider whether the original material should be preserved, or if reproductions and replacement parts are viable options to respect the artist's intent. Treatment images of Meret Oppenheim's "Eichhornchen" (Squirrel); Patrick Cox's "Eiffel Tower jelly sandals"; Huma Bhabha's "Waiting for another game"; and Eko Negroho's "Carnival Trap II" will be used to illustrate these themes. The artist questionnaire is discussed as a useful tool for establishing relationships with living artists, and to document materials, manufacturing processes, and the artist's thoughts about acceptable levels of change for their work of art. The aim of the paper is to emphasise that conserving plastic art objects requires creativity and collaboration to balance the vision of the artist, with the physical limitations of treating ageing plastic materials in an institutional setting.

P2: Poster presentation 2

Time: Thursday, 12/Oct/2023 & Friday, 13/Oct/2023: Coffee Break Time

The PVC Bodies of Kiki Kogelnik

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Keywords: Kiki Kogelnik, PVC (polyvinyl chloride, PVC artworks, plasticiser, migration

In the 1960s, the artist Kiki Kogelnik (1935-1997) began to use her archive of collected silhouettes, created by tracing bodies of people, in an act she called 'taking', to create a series of sculptural works, referred to as *Hangings*¹. The artist created these works by using the tracings to transfer the bodily shapes onto polyvinyl chloride (PVC) material and typically draped the PVC cut-outs onto clothing hangers or hung in multiples on clothing racks. Considering the age of the PVC works, they are in excellent condition. However, the Hangings have shown signs of plasticiser migration, yellowing and brittle areas of the material. Ageing studies and cleaning tests, have provided insights into preventative care of PVC artworks, aiding in the longevity of such objects². Such preventative measures include storage in closed environments, as well as soft mechanical surface cleaning to reduce dust accumulation and to maintain their visual appearance. These measures have been carried out on all PVC *Hangings*, facilitated by the Kiki Kogelnik Foundation.

[1] The Kiki Kogelnik Foundation website [<https://www.kikikogelnikfoundation.site/Kiki-Kogelnik/>]

[2] A. Royaux et al. *Polymer Degradation and Stability* **2017**, *137*, 109-121;
<https://doi.org/10.1016/j.polymdegradstab.2017.01.011>

P3: Poster presentation 3

Time: Thursday, 12/Oct/2023 & Friday, 13/Oct/2023: Coffee Break Time

Alain Jacquet and the Restoration of Inflatable Objects Made of PVC-P - An Approach

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Keywords: Alain Jacquet, PVC-P, inflatable cushion, conservation, restoration concept

In 1965, Alain Jacquet created *La Source*, an inflatable cushion made of PVC-P, which was printed recto in CMYK. The main problem with the object is the progressive degradation and embrittlement of the valve material. After intensive study of *The Decision-Making Model for Contemporary Art, Conservation and Presentation* (Cologne Institute of Conservation Sciences, 2019), it was concluded, that the object's re-inflatability is a work-defining property and can only be restored with the help of a functioning valve. This work over the past year has been an attempt to develop a restoration concept, as well as a concept for storage, handling and an authentic form of presentation of the object. The conservation and restoration of reference objects made of inflatable PVC-P is presented.

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