Exploring perspectives for conserving the future of our plastic heritage

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Abstract

This Letter to the Editor argues that plastics should be understood not only as an environmental challenge to be mitigated, but also as a form of heritage requiring ethical care, scientific understanding, and long-term stewardship. It also recognises that plastics are increasingly understood as matters of human health and justice, not only of environmental concern (Landrigan et al., 2023). Established in 2025, the PlastIC Innovation + Curation Research Centre (PlastIC) works in close collaboration with the Museum of Design in Plastics (MoDiP). Museum collections containing plastic artefacts can provide critical insights into polymer degradation and material longevity that are directly relevant to contemporary debates on sustainability and future plastics innovation. The PlastIC Innovation + Curation Research Centre investigates the nature of plastics degradation over time and seeks to bring this insight forward to inform material choices for more sustainable and safer futures.

Letter to the Editor

Plastics are widely recognised as a major contributor to global pollution and are increasingly understood as a threat to human health and environmental justice (Landrigan et al., 2023), yet they are also among the most culturally significant materials of the twentieth and twenty-first centuries. While policy, scientific research, and public debate have focused on the negative implications of plastics, far less attention has been paid to the growing body of polymer-based heritage already held within museums, archives, and design collections. These materials, produced during the rapid expansion of synthetic polymers after the Second World War, now constitute an irreplaceable record of technological innovation, social change, and material culture.

This Letter to the Editor argues that plastics should be understood not only as a multifaceted challenge to be mitigated, but also as a form of heritage requiring ethical care, scientific understanding, and long-term stewardship. In addition, museum collections provide critical insights into polymer degradation and material longevity that are directly relevant to contemporary debates on sustainability and future plastics innovation.

Over the last three decades, museums have increasingly collected objects made from synthetic polymers, particularly in the fields of design, industrial heritage, and modern and contemporary art. Institutions such as the Museum of Design in Plastics (MoDiP) at Arts University Bournemouth in the United Kingdom exemplify this shift, holding a polymer-based collection of national significance that documents post-war

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consumer culture, manufacturing practices, and material experimentation. However, the inclusion of plastics within heritage collections has exposed a fundamental challenge: many polymers degrade rapidly and unpredictably, often within a human lifetime. Unlike traditional heritage materials such as stone, metal, or ceramics, plastics were rarely designed with long-term stability as a primary consideration (Shashoua, 2008). As a result, museums now face the complex task of conserving objects whose material instability was often insufficiently understood at the time of their formulation.

Research in heritage science has demonstrated that polymer degradation is widespread in museum collections. Conservation surveys and condition assessments reported across European institutions document common symptoms including discolouration, embrittlement, surface tackiness, cracking, and the release of acidic or plasticising compounds (Lavédrine et al., 2012). These processes challenge earlier assumptions that plastics were inherently durable, drawing attention to the material vulnerability of objects that are now central to narratives of contemporary heritage. Such findings underscore the need for conservation strategies grounded in materials science as well as curatorial knowledge.

Heritage practice has traditionally been shaped by materials whose ageing processes unfold over centuries, allowing for relatively stable conservation frameworks. The degradation of plastics, by contrast, presents both technical and conceptual challenges, as many polymers deteriorate rapidly and irreversibly, sometimes reaching a point at which physical intervention is no longer possible. In response, conservators, curators, material analysts, and historians have prioritised preventive strategies, including environmental control, isolation of unstable objects, and detailed documentation of change over time (Shashoua, 2008). While these approaches can slow degradation, they are resource-intensive and raise questions about sustainability, particularly with respect to energy demands associated with climate-controlled storage.

Museums are under growing pressure to reduce their environmental impact, yet the sustainability implications of plastic conservation are increasingly difficult to ignore. More broadly, the environmental and human-health implications of plastics themselves sharpen this tension within conservation discourse (Landrigan et al., 2023). This has prompted calls for more reflective and balanced approaches that recognise both the ethical responsibility to preserve cultural heritage and the environmental costs of doing so (Muñoz-Viñas, 2005). In this context, plastics pose a particular dilemma: conserving materials that are themselves emblematic of unsustainable production and consumption practices can appear contradictory. This tension is mitigated, however, when plastics are also understood not as contemporary commodities, but as historical evidence of past material regimes.

Within museum and archive collections, plastic objects that have already been accessioned and interpreted as cultural heritage stand as material representatives of specific historical moments in the development of modern society. Treating such plastics as heritage enables a more nuanced engagement with their environmental legacy. These polymer-based artefacts embody past assumptions about material permanence, disposability, and technological progress. Their degradation offers tangible lessons about the consequences of material choices made in design, manufacturing, and policy. Museum collections, therefore, function as sites for long-term observation of polymer ageing under real-world conditions. Unlike accelerated ageing experiments, which are necessarily reductive, heritage objects provide empirical evidence of how specific polymer formulations respond to decades of environmental exposure, handling, and storage (Shashoua, 2008; Lavédrine et al., 2012). This knowledge constitutes a valuable foundation for contemporary materials research, particularly in efforts to design polymers with more predictable lifespans, improved environmental performance, and safer material profiles that reduce harmful effects on people.

The value of heritage-based insight into plastics degradation has been increasingly recognised through interdisciplinary collaborations between conservators, chemists, and materials scientists. European research initiatives such as the POPART project, together with ongoing work within the International Council of Museums - Committee for Conservation (ICOM-CC) Modern Materials and Contemporary Art Working

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Group, have demonstrated the benefits of combining analytical chemistry with curatorial and conservation expertise (European Commission, n.d.; Beerkens and Learner, 2014). These initiatives emphasise selective, research-led approaches to plastic heritage, focusing on representative objects whose material histories can inform broader understanding rather than advocating indiscriminate preservation.

In the UK context, collaborations between heritage institutions and research centres similarly highlight the potential for heritage science to inform materials innovation. Within this landscape, the PlastIC Innovation + Curation Research Centre, working in close collaboration with MoDiP (both based at Arts University Bournemouth in the United Kingdom), positions polymer-based heritage as an integrated site of inquiry. Here, conservation practice, materials research, environmental responsibility, and ethical reflection are deliberately considered together through collections-based research and interdisciplinary engagement. This approach positions museum-held plastic objects as both cultural artefacts and material evidence, capable of contributing to critical discussions about sustainability, innovation, and the future ways we will design and use plastics.

Despite these developments, cultural and heritage perspectives remain marginal within dominant policy discussions on plastics. International negotiations aimed at addressing plastic pollution have largely focused on waste management, recycling infrastructures, chemical regulation, and, increasingly, human health, while legacy plastics in museum and archival collections receive limited explicit consideration. This absence is notable given that such collections preserve material evidence of past production and consumption practices that continue to shape present environmental challenges. Integrating heritage perspectives into plastics governance would not weaken environmental or health objectives; rather, it would provide a longer-term, culturally informed context for understanding the consequences of material decision-making.

In this context, museums play a critical role in mediating this perspective. Through exhibitions, research, and public engagement, they can frame plastics as historically valuable materials whose benefits, material failures, and wider environmental and health implications are equally instructive. Presenting degraded plastic objects alongside interpretive information about their composition, deterioration, and associated hazards can foster material literacy and encourage more reflective attitudes toward contemporary plastic use. From an ethical standpoint, conserving polymer-based heritage is not an endorsement of past practices, but an acknowledgement of responsibility toward future generations, ensuring that the material record of the "plastic age" remains available for critical examination rather than disappearing through neglect.

Now, evidently, given finite resources, not all plastic objects can or should be preserved indefinitely. Ethical conservation requires transparent criteria for significance, representativeness, and research value (Muñoz-Viñas, 2005), alongside acceptance that material loss may sometimes be unavoidable. What is essential, however, is that such loss occurs through informed decision-making grounded in an understanding of material behaviour. Research centres that integrate collections-based inquiry with materials analysis and design scholarship play an important role in supporting this process. By situating polymer degradation within broader cultural and scientific frameworks, such work contributes to more reflective and responsible approaches to heritage stewardship.

In conclusion, plastics should be recognised as both a multifaceted contemporary challenge and a form of modern heritage. The polymer-based objects already held in museums are not peripheral to debates about sustainability; they are central to understanding how material choices shape societies over time. Heritage science offers empirical insight into plastics' long-term behaviour, while curation and conservation ethics provide a framework for responsible stewardship. Bringing these perspectives into dialogue with materials innovation and policy is both timely and necessary. As efforts to address plastic pollution intensify, there is a parallel need to care for the material legacy that plastics have already left behind. Reframing heritage conservation in ethical and interdisciplinary terms allows it to contribute meaningfully to the development of more sustainable material futures.

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A useful next step, beyond the scope of this letter, would be to establish significant alliances and examine practical routes by which collections-based evidence could inform plastics standards, design guidance, and policy deliberation.

References

Beerkens, L., & Learner, T. (Eds.). (2014). *Modern materials and contemporary art: Proceedings of the interim meeting of the Modern Materials and Contemporary Art Working Group*. Getty Conservation Institute. ISBN: 978-1-937433-21-5 (online resource)

European Commission. (n.d.). POPART: Preservation of plastic artefacts in museum collections (Project No. 212218). *CORDIS EU Research Results*.

Keneghan, B., & Egan, L. (Eds.). (2008). *Plastics: Looking at the future and learning from the past: Papers from the conference held at the Victoria and Albert Museum, London, 23–25 May 2007*. Archetype Publications. ISBN: 9781904982432

Landrigan, P. J., Raps, H., Cropper, M., et al. (2023). The Minderoo-Monaco Commission on Plastics and Human Health. *Annals of Global Health, 89*(1), 23. https://doi.org/10.5334/aogh.4056

Lavédrine, B., Fournier, A., & Martin, G. (Eds.). (2012). *Preservation of plastic artefacts in museum collections*. Comité des travaux historiques et scientifiques. ISBN: 9782735507702

Muñoz-Viñas, S. (2005). *Contemporary theory of conservation*. Elsevier Butterworth-Heinemann. https://doi.org/10.4324/9780080476834

Shashoua, Y. (2008). *Conservation of plastics: Materials science, degradation and preservation*. Butterworth-Heinemann. https://doi.org/10.4324/9780080878782

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