



AUSTRALIAN INSTITUTE FOR THE CONSERVATION OF CULTURAL MATERIAL INC.

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Abstract

Title:

An investigation into 3D printed objects and their potential conservation stability issues

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Abstract:

In this study seven 3D printed objects acquired by the Museum of Applied Arts and Sciences (MAAS) are investigated. The identification of the material type for each object is essential to determine its long term future and preservation in the collection. These objects can be made from new and modern materials and fabricated using new technologies which may pose questions about their conservation stability and long term preservation.

Plastic is the most common material used in 3D printing. The two dominant plastic filaments used are Acrylonitrile butadiene styrene (ABS) and Polylactic acid (PLA). PLA a bioplastic derived from renewable resources such as corn starch and sugar cane. It is also biodegradable. By nature it would pose some issues relating to its degradation pathways.

This investigation found that 5 objects were made by Selective Laser Sintering (SLS), an additive manufacturing technique using Nylon; 1 from ABS and 1 from PLA. The PLA object poses some conservation issues. As PLA is degraded by hydrolysis which acts as the initial step splitting the polymer into its monomers after which the monomers can be biodegraded, although the reaction is slow at room temperature. Potential degradation for Nylon and ABS will also be outlined.

It is necessary to be aware that these 3D printed objects can pose conservation issues relating to their stability which will affect their survival and preservation.

I argue that the identification of materials used for 3D printed objects is essential for their determination of the conservation stability.

Brief Biography of the Author(s):

Sue Gatenby manages the Conservation research projects and collection Care for the Museum of Applied Arts and Sciences. She has a Bachelor of Science from the University of Sydney as well as a Master's Degree of Applied Science in the Conservation of Cultural Materials

from The University of Canberra. Sue also holds a Certificate IV in Assessment and Workplace Training. Present projects include Assessment of cellulose Acetate samples with the Getty Conservation Institute and analysis of Japanese swords with ANSTO. Sue is involved with the analysis of unknown materials in the museum collection using FTIR-UATR and XRF methodology. Sue is also a Professional Member of AICCM.

Sue previously worked at the Australian Museum as an ethnographic conservator with a special interest in indigenous painted surfaces and mould related issues. Recipient of ESSO and UNESCO scholarships and studied at ICCROM to further her conservation and science training.