

Scratch That: Conservation Treatment of Abraded Plastic, a Technical Study

Corrected authors:

Sarah Barack, Beth Edelstein, Greg Lastrapes, Sarah Lavin, Ina Martin, Batyah Shtrum and Jessica Walthew

Aging plastics create challenges for conservators attempting treatment, with scratches, abrasion, discoloration and other condition issues often arising. While cleaning and/or polishing these surfaces may improve the appearance, questions remain regarding which protocol to follow. This on-going technical study of aged Cellulose Acetate Butyrate (CAB) evaluates a commercial product marketed for plastic/acrylic objects, the NOVUS 7100 Plastic Polish system, which includes three compounds (1, 2, and 3) meant to be applied in sequence. Between 2013 and 2018 SBE Conservation LLC, a Brooklyn-based private objects conservation firm, conserved three vacuum-formed reverse painted UVEX (a commercial name for CAB) sculptures by Tom Wesselmann, created in the mid-1960s. These complex, large-scale objects presented a range of condition issues, including those related to fabrication stress, expected plastics degradation, and past restorations. The conservation treatments focused on overall stabilization of the fragile objects, visual reintegration of areas of plastic loss, surface cleaning and polishing, and replacement of the deteriorated backing. This comprehensive project served as the impetus for the study, which utilized samples of both discarded, aged CAB and recently manufactured “fresh” CAB. Samples of both plastics were abraded with 800 and 1500 grit Micro Mesh, in a uni-directional pattern, and then polished with the NOVUS system. Reflectance Transformation Imaging (RTI) was used to document the qualitative results of polishing. Optical profilometry was used to characterize the surface morphology and quantify the surface roughness; specifically, height profiles were obtained using a Nanovea ST400 optical profilometer, which uses chromatic confocal microscopy to determine pixel heights. Results showed that treatment with Novus 1 alone was not very effective as the difference in surface roughness between scratched and treated samples was minimal. Polishing with the addition of Novus 2 and 3 was much more effective as the roughness decreased significantly in these cases. Preliminary contact angle measurement results were presented demonstrating significant differences between fresh and aged CAB in surface chemistry, but further investigation of changes in surface chemistry is planned to complement the analyses already performed. To this end, future research with accelerated aging is planned to allow assessment of long-term effects of different polishing techniques and materials, including questions of residues left on sensitive plastic surfaces.