

Synthetic and semi-synthetic polymeric materials are a dominant component of many modern and contemporary gallery and museum collections. For more than a century, they have enabled new and exciting forms of artistic and design expression and communicate the social history of the 20th Century. It is essential that they are preserved, however, conservators and scientists do not have clear guidelines on how this could be done most efficiently.

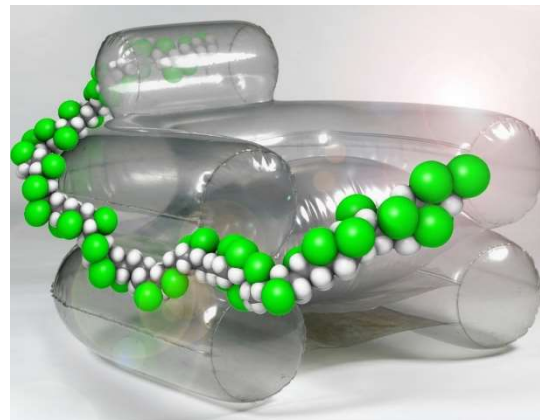
Preventive conservation is a domain of conservation which also modifies the storage environment in order to simultaneously make it possible to care for many objects at the same time in a most economically and environmentally efficient way. In order to achieve this, we need to understand the basic principles of degradation of a given material, which requires scientific research, and evaluate the outcomes of such research from a curatorial and collection management point of view.

Previous research has shown that of all the polymeric materials in collections, three polymers are particularly problematic as they degrade fast – their degradation can be evident in a few decades, leading to a reduced aesthetic appeal, stickiness or even cracking. Ultimately, chemical and mechanical degradation of such objects leads to complete loss. These three polymers are cellulose acetate and cellulose nitrate and poly(vinyl chloride), PVC. The former two have been studied in a lot of depth already, while PVC has not been the subject of any concerted national or international research effort.

To fill this knowledge gap, a team of researchers from the Jagiellonian University, Jerzy Haber Institute and University of Ljubljana with long-term experience in polymer science and conservation research, will join efforts with conservators and curators from heritage institutions such as Cricoteka (Krakow), Museum of Architecture and Design (Ljubljana) and Centre Pompidou (Paris).



*Example of iconic PVC art object:
Dead class by Tadeusz Kantor, Cricoteka,
Krakow, Poland*



*Example of iconic PVC design object:
Fauteuil Blow, from MNAM, Centre Pompidou,
Paris, France*

The principal aim will be to study PVC degradation processes in collections, research the chemistry and mechanics of degradation of PVC in historical sacrificial samples using numerous scientific techniques and develop computational models of damage accumulation in PVC. By damage, we specifically mean processes that represent conservation concerns such as discolouration, surface stickiness and cracking, during conditions of long-term storage. On the basis of understanding and modelling the link between the rate of degradation, environmental conditions and material composition, it will be possible to develop preventive conservation guidance for PVC.

Although PVC has been studied extensively by scientists and engineers in the past, they focused particularly on degradation that takes place at elevated temperatures and such research has limited relevance to conservation. New degradation research is necessary in order to understand PVC degradation during storage, i.e. at room temperature.

Furthermore, an innovative online modelling tool will be developed, which will enable conservators to examine the data and develop environmental guidance for their collections.

The collaboration of Polish and Slovenian researchers is essential, as the required expertise does not exist in either of the two countries alone.

The research will be disseminated through scientific media, but also through a website intended for the general audience, through events and seminars.