

Elastomer identification by Pyrolysis GC-MS in museum collections

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Elastomers cover a variety of formulations. Commonly referred to as *rubbers*, recognizing them still can be challenging, and their names in heritage collections can be imprecisely inventoried. Also, data about their behavior over time is limited, even if some pieces already require conservation-restoration treatments.

This requires both precise identification and knowledge of the chemical structure about rubber in collections. To address this while meeting the need to develop relevant approaches for their conservation, a joint project [1] involves the scientific laboratories of the Bibliothèque nationale de France (BnF), Centre de Recherche et de Restauration des Musées de France (C2RMF), Centre Interdisciplinaire de Conservation et Restauration du Patrimoine (CICRP), and conservators from the Musée National d'Art Moderne - Centre Georges Pompidou (MNAM-CGP). By correlating analytical characterization results with observations obtained from collections surveys and the expertise of each partner, a recognition protocol for elastomers was developed.

Using pyrolysis - gas chromatography - mass spectrometry (Py-GC/MS) on elastomers provides their molecular identification. A database was created by identifying and compiling marker molecules of 80 elastomers of known composition. A tool relying on this database was developed to process raw Py-GC/MS data automatically and to yield a direct identification of the elastomer. The tool will be openly shared to anyone interested in identifying elastomers.

The tool has been so far successfully used on 148 samples from the MNAM-CGP collections, and the identifications are being compared with the collection survey data, generating useful conclusions on artworks difficult to preserve.

References

1. ElaStomer identification by Pyrolysis GC-MS in museum cOllectioNs (ESPyON) a research project funded by the Fondation des Sciences du Patrimoine (FSP)