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Editorial

# Mass Spectrometry of Art and Cultural Heritage

Material science research on objects of art and cultural heritage is a fast developing field that presents many practical challenges. Sampling and analytical strategies for unique art objects must provide as much information as possible on the composition, history and condition of the artefacts, while ensuring minimal intervention, i.e., minimal sampling. The pursuit of more accurate data using ever smaller samples has been a significant driving force in this field, and mass spectrometry – with its combination of precision and sensitivity – has become a key tool in the study of works of art since the first applications in museum studies were published in the 1960s. The articles included in this special issue reflect the current breadth of applications of mass spectrometry in the study of works of art and cultural heritage, from the development of new methods in a more exploratory role to the use of a mass spectrometer as a sensitive and versatile detection instrument in more applied research.

The studies presented illustrate different approaches to investigating art objects and historic artefacts. The first approach considers an object's broader cultural significance. The identification of the material composition of an object has many art historical and technological implications, providing a better knowledge of the materials and methods used at a certain period, or by a specific culture or artist as well as information on technological advances, different trends and responses to the introduction of new materials. The second approach focuses on the object itself. The understanding of the chemistry of an object can provide insight into how the different components interact with the environment and with one another, and how these interactions influence the object's long term condition and stability. Such knowledge can lead to the development of better preventive and active preservation strategies for works of art and artefacts.

This special issue covers a wide range of objects, from archaeological glass beads to easel paintings to rock art, and diverse materials from ancient lacquers and natural resins to modern synthetic polymers. Methods are presented that are not yet fully exploited in the field of cultural heritage research, such as ESI-QToF tandem MS and ESI-FTMS along with well-established methods such as GCMS. Samples from works of art or cultural heritage artefacts are often unique creating a particular concern about the reproducibility and accuracy of the results, which can be assured by the cooperation and collaboration between laboratories. Experimental approaches that address this concern are also described in this issue. We trust that this unique compilation of peer reviewed articles dedicated to the application of mass spectrometry to the study of works of art or cultural heritage will be an important research and teaching tool.

The dialogue and collaboration among conservation and heritage science professionals reflected in the contributions has been an enduring feature of this research field. Since its inception in 2003, the Users' Group for Mass Spectrometry and Chromatography (MaSC) has grown as an active forum for exchange of knowledge, experience and expertise among conservation and heritage science professionals internationally. In addition to the two guest editors, the members of the MaSC organising committee were closely involved in the composition of this special issue, assuring that the manuscripts included are of a high standard and representative of the diversity of current worldwide research efforts. The high quality of MS based research is evident from the content of this special issue. It showcases that mass spectrometry's intrinsic interdisciplinary nature will continue to contribute to the improvement of the understanding, conservation and protection of our cultural heritage.

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