Cultural Heritage & Synchrotron Radiation: Quo Vadis?

Koen Janssens

Faculty of Science, University of Antwerp, Belgium - **koen.janssens@uantwerpen.be**

Synchrotron radiation is being used to an increasing extent to examine cultural heritage (CH) materials and artefacts. In this presentation, an attempt will be made to provide an overview of activities during the last five years and to highlight some trends. As the basis of this presentation, a number of recently reviews will be used,[1-3] as well as the scientific programmes of the last few editions of the Synchrotron Radiation in Art and Archaeology (SR2A) conference.

Broadly speaking, synchrotron radiation based investigations of cultural heritage materials can be divided into two categories: those mainly targeted towards imaging, usually with the aim of better understanding the build-up, the creation process and/or the current state of conservation of specific CH artefacts. Such imaging can be executed at different length scales but usually involves the macroscopic level, as most CH artefacts have 'human' dimensions, i.e., in the cm-m range.
To complement such studies, in a second category of investigations, the materials that comprise CH artefacts, but no longer the artefacts as a whole, are the focus of attention. In many cases, next to (minute samples of) original artefacts, attention is devoted to series of self-synthesized modern equivalents (mock-ups) that have been prepared in well-controlled laboratory circumstances. The combined study of original and mock-up samples of this kind usually serves to experimentally verify one or more hypotheses on the (ancient) manufacturing technology employed to produce a particular CH material and/or to study the way this material responds to physical and chemical agents during the course of its lifetime.

References

[1] K. Janssens, M. Cotte, The use of XAS and related methods in Cultural Heritage investigations. International Tables for Crystallography, Vol. I, Chapter 8.16 (in press, 2019).

[2] M. Cotte, A. Genty-Vincent, K. Janssens, J. Susini, Applications of synchrotron X-ray nano-probes in the field of cultural heritage - Application des nano-faisceaux de rayons X synchrotron dans le domaine du patrimoine, Comptes Rendus Physique 19 (2018) 575-588. https://doi.org/10.1016/j.crhy.2018.07.002

[3] K. Janssens and M. Cotte, Using Synchrotron Radiation for Characterization of Cultural Heritage Materials, in: E. J. Jaeschke et al. (eds.), Synchrotron Light Sources and Free-Electron Lasers, https://doi.org/10.1007/978-3-319-04507-8_78-1, Springer Nature Switzerland AG 2019.