KN5 Cultural Heritage, Materials Science and Synchrotron Radiation: a perspective from a group of Portuguese users

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Abstract

Synchrotron radiation is a powerful tool for the non-destructive analysis of cultural heritage materials. The application of synchrotron radiation to cultural heritage research has yielded significant advances in fields such as archaeology, art conservation, and materials science. Several synchrotron facilities around the world have dedicated beamlines for cultural heritage research. In Europe, some examples are the European Synchrotron Radiation Facility (ESRF), SOLEIL synchrotron and ALBA synchrotron. These beamlines provide specialized support and instrumentation that allow researchers to study cultural heritage objects at high spatial resolution and with a wide range of techniques. These dedicated beamlines provide techniques for the non-destructive analysis of cultural heritage objects, such as X-ray absorption spectroscopy, X-ray fluorescence, X-ray diffraction, and X-ray imaging. The information gained from these studies is essential for the preservation and restoration of cultural heritage objects, as well as for advancing our understanding of the composition and structure of these materials, helping researchers understand the techniques and technologies used in the production of these materials, as well as their provenance and history of use.

In this communication, examples to be presented are related to ancient ceramics, glasses, archaeological slags, inorganic pigments and lithologic materials where we were able to gain new insights into composition, structure and degradation processes, contributing to their preservation and interpretation for future generations.

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