

From ceramics and glasses to mortars and stones: using synchrotron radiation to study cultural heritage

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The use of Synchrotron Radiation to study cultural heritage, either through objects with museum interest or materials from historical monuments is no longer a novelty. Advanced non-destructive characterization techniques to understand degradation phenomena, ageing mechanisms and ancient manufacturing techniques is now a well-established trend.

Profiting from the properties of synchrotron radiation and using large scale facilities such as ESRF (European Synchrotron Radiation Facility, Grenoble, France), BESSY (Berliner Elektronenspeicherring-Gesellschaft für Synchrotronstrahlung, Berlin, Germany) and former LURE (Laboratoire pour l'Utilisation du Rayonnement Synchrotron, Orsay, France), it was possible to study a great diversity of materials and objects of cultural value from different ages and provenances through X-rays.

Synchrotron radiation sources available at these large-scale facilities provide powerful chemical and structural characterization tools such as micro X-ray fluorescence and X-ray absorption spectroscopies (XANES and EXAFS).

Different case studies will be presented regarding the variety of materials studied by a group of Portuguese researchers from the past two decades (ceramics, glasses, inorganic pigments and lithologic materials).

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