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SYNCHROTRON LIGHT FOR THE MICRO-ANALYSIS OF ARTISTIC MATERIALS

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Abstract

How did Rembrandt produce his impastos? Why some of the chrome yellows used by van Gogh in the Sunflowers do not show their original colour? Did Egyptian and Roman craftsmen use the same methods to produce opacified glasses? These are typically questions to which chemical analyses can contribute to answer. Indeed, the application of analytical chemistry to decipher the composition and state of conservation of artworks has been intensely increasing over the last decades. Among the many methods available, X-ray microscopy techniques are particularly suitable since they reveal not only the material composition but also the location of the different components. This is very useful to understand a posteriori the artists and craftsmen techniques but also to identify degradation products. Different synchrotron based techniques can be combined (micro X-ray fluorescence, micro X-ray absorption spectroscopy, micro X-ray diffraction) providing various contrasts and allowing to locally tackle the materials via different chemical points of view. In my talk, I will present experiments recently carried out at the European Synchrotron Radiation Facility (ESRF), Grenoble, France. Researchers come from all over the world, bringing tiny samples, to reveal subtle chemical signatures characteristic of certain artistic productions, or, unfortunately, past or on-going alterations. The examples will illustrate the very wide range of artistic materials which can be studied (paintings, ceramics, glasses, manuscripts, photographs, plastics...), the different techniques which can be used and the many pieces of information they provide. I will also briefly present the ESRF upgrade phase 2, in particular the new EBS (extremely bright source) and the on-going instrumental developments, explaining how they will contribute to the cultural heritage field.

About

Marine Cotte, researcher at the French National Centre of Scientific Research (CNRS), is currently seconded at the European Synchrotron Radiation Facility (ESRF) in Grenoble, France, where she develops new technologies to examine works of art and archaeological objects. Her research is of enormous value to society because it provides the basis for managing and protecting important examples of cultural heritage. By working with museums, she joins the interests of science to those of society and links cultural heritage to advanced technology. Marine is a pioneering and dedicated researcher who herself took the first steps towards working with Dutch researchers. Receiving the Descartes-Huygens Prize will allow her to go to the Netherlands several times to work with researchers at Delft University of Technology, Eindhoven University of Technology, the Rijksmuseum in Amsterdam and other institutions. She will enter into new alliances with museum conservationists, curators, art historians and technical scientists.

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