Contribution ID: **78** Type: **ORAL**

Synchrotron-based techniques to study calcite crystals covering ornated cave walls

Monday, 13 June 2022 16:50 (20 minutes)

Paleolithic ornated cave walls can be affected by the development of a calcitic coating called moonmilk, that can lead to conservation issues when located at the vicinity of painted or engraved areas. Moonmilk is made of calcite needles called NFC (Needle Fiber Calcite) around one micron large and tens to hundreds of microns long and presenting different morphologies. It is still being discussed whether a purely physico-chemical or a biological process is involved regarding the formation and growth mechanisms of moonmilk. In this study, moonmilk samples coming from different non ornated caves located in the Vézère Valley (Dordogne), and representative of the ornated caves of this area part of the UNESCO World Heritage List (Lacanette *et al.* 2013), were analyzed at the SOLEIL synchrotron light source (Université Paris-Saclay). The objective was to look for potential tracers of the growth mechanisms involved, both from a chemical and crystallographic point of view. Experiments were carried out on three different beamlines combining X-ray diffraction analyses on single crystals (PROXIMA2 beamline), micro-spectrofluorimetry analyses to assess the presence of organic matter (DISCO beamline) and X-ray fluorescence mapping with a resolution of 150 × 150 nm in order to determine local chemical variations (Nanoscopium beamline). This work presents a synthesis of the results obtained, giving new insights regarding the discussion on the origin of moonmilk.

Primary author: BASSEL, Lena (International Atomic Energy Agency, Austria)

Co-authors: Ms LACANETTE, Delphine (UMR CNRS 5295 I2M, Université de Bordeaux); Mr SOMOGYI, Andrea (Synchrotron SOLEIL); Mr CHAPOULIE, Remy (UMR CNRS 6034 Archéosciences Bordeaux); Ms FERRIER, Catherine (UMR CNRS 5199 PACEA); Mr GUINEBRETIERE, René (UMR CNRS 7315 IRCER, Université de Limoges); Mr MEDJOUBI, Kadda (Synchrotron SOLEIL); Mr PECHEV, Stanislav (UMR CNRS 5026 ICMCB, Université de Bordeaux); Mr REFREGIERS, Matthieu (Synchrotron SOLEIL); Ms REGUER, Solenn (Synchrotron SOLEIL); Mr ROSA, Patrick (UMR CNRS 5026 ICMCB, Université de Bordeaux); Mr SHEPARD, William (Synchrotron SOLEIL)

Presenter: BASSEL, Lena (International Atomic Energy Agency, Austria)

Session Classification: Interpretation, presentation and dissemination of the scientific results. Case studies and success stories

Track Classification: Track 2: Interpretation, presentation and dissemination of the scientific results