MS33-P12 | SERIAL-MOF: DEVELOPING SERIAL CRYSTALLOGRAPHY METHODS FOR MOF NANO-CRYSTALS

De Zitter, Elke (Synchrotron Soleil, Gif-sur-Yvette, FRA); Savko, Martin (Synchrotron Soleil, Gif-sur-Yvette, FRA); Jeangerard, Damien (Synchrotron Soleil, Gif-sur-Yvette, FRA); Tissot, Antoine (Institut des Materiaux Poreux de Paris IMAP, Paris, FRA); Marot, Jerome (Institut Lavoisier de Versailles, Versailles, FRA); Cadot, Emmanuel (Institut Lavoisier de Versailles, Versailles, FRA); Serre, Christian (Institut des Mateeriaux Poreux de Paris IMAP, Paris, FRA); Shepard, William (Synchrotron Soleil, Gif-sur-Yvette, FRA)

Metal-organic frameworks (MOFs) form a class of porous materials made from metal cores linked together by organic moieties and have diverse functionalities. With the ease of metal node alteration and (post)modification of the organic linkers, the MOF-research field permits the development towards tailor-made solutions to various problems in the field of gas separation, catalysis, energy storage, etc.

Due to their small crystal sizes and high metal content, the structural study of MOFs has been mainly limited to powder diffraction and electron microscopy which do not allow detailed structural investigations. As MOFs form the research topic of an ever increasing number of researchers, new and more powerful methods need to be developed and standardized for the structural study of these porous materials. Here, we show how serial synchrotron crystallography (SSX) provides an answer for this demand. Using ZIF-8 and MIL-100(Fe) crystals of sizes ranging from the sub-micrometer to tens of micrometers, we show different fixed-target strategies for successful crystal delivery, data collection and data processing at the microfocus beamline PROXIMA 2A at SOLEIL. These proof-of-principle studies demonstrate how SSX can overcome hurdles such as small crystal size and radiation sensitivity in the structure determination of small molecules and porous materials – making this strategy accessible to researchers from a broader range research areas.