

## Chemical characterization at the ESRF

*Tuesday, 12 November 2019 11:00 (30 minutes)*

The highly brilliant X-ray beam at the ESRF allows application of sophisticated techniques for identification of the chemical state. High-resolution powder diffraction pushes the limits of solving and refining of crystal structures and investigating the structure of crystalline, defective and non-crystalline materials via atomic pair distribution function (PDF) analysis. X-ray spectroscopy provides an element-selective tool to study the chemical state of an analyte. Here, the ESRF has been pioneering the development of photon-in/photon-out spectroscopy that allows for higher spectral resolution and probes unoccupied as well as occupied electronic levels (Figure 1). This technique will enter a new dimension with the upgrade programme ESRF-EBS where it will be combined with a micron-sized beam. This unique technical development provides access to the study of “invisible” elements, i.e. analytes in low concentration in a matrix of elements with similar atomic number. The presentation will provide brief explanations of the techniques, present the most important technical developments and give examples to illustrate the new possibilities.

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