Research highlights at the XAFS beamline of Elettra

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The XAFS beamline at Elettra is dedicated to X-ray Absorption Spectroscopy (XAS). It is a standard energy scanning XAS beamline installed on a bending magnet source and has been designed to cover a wide energy range (from 2.4 to 27 keV) that allow to investigate the majority of the chemical elements of the period table [1]. Different collection modes and sample environments are available, including liquid-N_2 cryostat, liquid-He cryostat, furnace and cells for liquid samples.

It is therefore conceived to be general purpose and open to a very wide community of users in many different fields. Its assets are to perform XAS with an excellent signal-to-noise ratio, stability, versatility, reliability and high automation level.

In this presentation, we will highlight the most recent results obtained at the XAFS beamline. These cover the most classical fields of XAS such as chemistry and materials science evidencing how the technique can play an important role in connecting the structural properties and the functional characteristics of complex systems. As well, we will show how XAS can be applied for answering questions related to the study of alternative sources of energy, such as innovative battery [2] and catalysts for fuel cells, which nowadays represents one of the main research subjects globally. Moreover, we will discuss results from other disciplines such as environmental science and archaeometry, for which the use of synchrotron radiation has become widespread only recently because of the need of a multidisciplinary approach to find remediation and conservation strategies in both fields.

References:

[1] Di Cicco, A., Aquilanti, G., Minicucci, M., Principi, E., Novello, N., Cognigni, A., & Olivi, L. (2009). Novel XAFS capabilities at ELETTRA synchrotron light source. In *Journal of Physics: Conference Series* (Vol. 190, No. 1, p. 012043). IOP Publishing.

[2] Giorgetti, M., Guadagnini, L., Tonelli, D., Minicucci, M., & Aquilanti, G. (2012). Structural characterization of electrodeposited copper hexacyanoferrate films by using a spectroscopic multi-technique approach. *Physical Chemistry Chemical Physics*, *14*(16), 5527-5537.