

The TwinMic spectromicroscopy beamline at Elettra: recent achievements and future perspective

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Characterisation and exploiting properties of complex materials with high spatial resolution requires the deployment of multidisciplinary techniques and expertise. Soft X-ray microscopy, combining imaging and spectroscopy at sub-micron scales, has already been recognised as a powerful technique proving both morphological and chemical information. The TwinMic microscopy station [1] operated in the 400-2200 eV energy range at the Elettra synchrotron has been attracting different scientific community, from Life Sciences to Cultural Heritage and Material Science, thanks to its complementary imaging capabilities (brightfield and phase contrast) with spatial resolution down to sub 20nm with special CDI methods, combined with low energy X-ray Fluorescence (XRF) [2, 3] and X-ray absorption microspectroscopy. Unique feature is that the developed low energy XRF system enables monitoring light elements down to B.

The presentation will use selected representative results to illustrate the recent achievements in the fields of neuroscience [4], nanotoxicology [5], clinical medicine [6,7], environmental science [8] and electrochemistry [9]. The progress in implementation of novel TwinMic imaging modalities for pushing the lateral resolution has recently been demonstrated by ptychography experiments with biological samples [10, 11]. Finally the first results of an on-going low energy XRF system development will be presented and discussed [12].

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