

Life science applications of Scanning Transmission X-ray Microscopy at Elettra

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Understanding the biochemistry and functionality of complex biological systems at sub-cellular length scales requires multidisciplinary approaches able to correlate the morphology of such complex systems with the chemistry involved in the biochemical processes. Scanning transmission X-ray microscopy combined with microanalytical techniques has already proven to be a powerful tool for exploring biological systems at submicron length scales [1]. The presentation will illustrate the most recent achievements of the soft X-ray spectromicroscopy research carried out at the TwinMic beamline at Elettra Laboratory. Selected results of tissue, cellular or subcellular analysis obtained by imaging with low-energy X-ray fluorescence spectroscopy [1] and micro-spot X-ray absorption spectroscopy represent research fields such as biotechnology, biomaterials, food science, nanotoxicology, neuroscience and clinical medicine [3-7]. They have provided new insights on brain energy metabolism [3], on cellular distribution, internalisation and degradation of engineered nanoparticles in fibroblast cells [4] and in digestive gland epithelium [5], on the chemical make-up of asbestos fibres in lung tissues [6-7] and on the distribution and correlation of the elements resulting from growth of plants under altered environmental conditions [8].

References.

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