TwinMic – A European Twin X-ray Spectromicroscopy Station

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Two types of transmission X-ray microscopes are worldwide in operation - scanning and full-field imaging - with different but complementary imaging capabilities. A novel approach used in a RT&D project of the European Commission (HPRI-CT-2001-50024) is aiming at integrating both microscope types in a single instrument with easy switch between the two modes. For the first time, a X-ray microscope is constructed by the united effort of European groups that have mastered in X-ray instrumentation, optics and detectors, nanotechnology, imaging and X-ray spectroscopy using different contrast mechanisms.

The expected potential and capability of such a twin microscope station is the combination of complementary microscope modes with versatile contrast techniques into a *single* instrument to perform: (i) X-ray imaging for morphological characterization combined with dynamical studies and tomography; (ii) spectromicroscopic analysis including elemental mapping and determination of specimen's chemistry on microscopic scale; and (iii) specimen characterization in their natural, solid or liquid environment.

Essential strength of the instrument is its wide working energy range from 250 - 2500 eV preserving the performance of individual microscopes. The photon energy range covers the water window between the C, N and O absorption edges and L-edges of Fe, Ni, Co with particular importance for characterization of magnetic materials. Access to K-absorption edges of elements opens up the opportunity for advanced studies in biology, medicine, pharmacology, geochemistry, environmental and earth sciences, and material research.

The TwinMic station is temporary hosted by the ELETTRA BACH beamline, where both scanning and full-field imaging modes past successfully first commissioning experiments.