

VESPERS beamline at the CLS: A powerful tool for geochemical and environmental researches

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VESPERS beamline is a hard X-ray microprobe beamline at the Canadian Light Source dedicated to X-ray micro-diffraction (μ XRD), X-ray micro-fluorescence (μ XRF), and micro X-ray absorption spectroscopy (μ XAS) studies. The beamline offers four widely differing bandwidths, $\sim 0.01\%$, $\sim 1.6\%$, $\sim 10\%$, and fully polychromatic beam, which allows to simplify the Laue diffraction analysis, to optimize XRF excitation, and to enable X-ray absorption spectroscopy measurement. The energy range provided by the beamline covers 6-30 keV.

The set of techniques provided by the beamline enables the determination of elements, mineral phases, and chemical speciations for a local micron-sized area, which is particularly useful for the inhomogeneous sample. The mapping capability is available using both XRF and XRD, especially micro-Laue-diffraction, simultaneously or consequently, to obtain the spatial distribution of elements, phases, and speciations.

The beamline is in operation for years and has a strong user community in geochemistry and environmental science. Some case studies in these research fields will be presented.