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Medium Energy Spectroscopy (MEX) - Opportunities for Microspectroscopy

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The medium energy range offers unique opportunities for synchrotron-based X-ray absorption spectroscopy across the sciences. In particular, the K-absorption edges of alkali and alkali earth elements, e.g. K and Ca, s-group elements, e.g. S, P and Se, along with d-block elements, e.g. Mn, Fe, Cu all fall within this energy range. As do various L- and M-edges for heavier elements, e.g. Pb and U. The nascent Medium Energy X-ray Spectroscopy (MEX) beamlines will access these edges and offer unique opportunities to study the local structure, speciation, and chemistry of compounds and systems critical to biological, environmental, geological and industrial processes.

Typically, characterisation of specific metal-ligand species requires isolation of the complex, necessitating disruption of native systems despite the attendant risk of redistribution and loss of chemical context. Despite the confounding potential of typical preparation methodologies, the tools available to coordination chemistry in situ have remained limited. The continuing synergy between synchrotron-based X-ray fluorescence microscopy (XFM) and X-ray absorption near edge structure (XANES) spectroscopy represents a powerful new analytical approach for studying chemistry in context.

Using illustrative examples and highlighting particular techniques, this presentation will introduce one of MEX's major end stations, the scanning X-ray fluorescence microprobe (μ MEX). To be installed on the MEX1 beamline, operating between 2 and 13.6 keV and focusing X-rays into a spot, less than 5 microns in diameter μ MEX will offer unique opportunities for synchrotron-based X-ray microspectroscopy. To date, the scarcity of such optimised facilities leaves many exciting scientific questions to be explored though such measurements also involve unique experimental challenges.

Presenter Gender

Man

Do you wish to take part in the Student Poster Slam

Condition of submission

Yes

Students Only - Are you interested in AINSE student funding

Level of Expertise

Experienced Researcher

Pronouns

He/Him

Which facility did you use for your research

Australian Synchrotron

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