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Ning Chen

Canadian Light Source, University of Saskatchewan, Saskatoon, SK

**Title | Element Specific Molecular Scale Structural XAFS Approach in Material Science**

**Abstract |** The Canadian Light Source (CLS) is Canada's national and international centre for synchrotron science and its applications, providing synchrotron radiation from infrared to hard X-rays with 20 beamlines operational, making wide range of unique research capabilities available. As one of the most extensively applied synchrotron techniques, X-ray absorption spectroscopy (XAS) plays its unique role in environmental, chemistry and geochemistry, chemical engineering, energy study, especially in material sciences. Its Nano to sub Nano scale element specific local structure detecting capability possess a spatial resolution of  $\sim 0.02\text{\AA}$  in scale, making molecular level structural characterization possible for both crystalline and amorphous systems. In this talk, the unique structural probing capability of XAS will be introduced through material bulk nature characterization, site-by-site, shell-by-shell and bond-by-bond coordination, structural compounds stacking, complex surface uptake, to size estimation for Nano to sub Nano scale particles and certain wet chemistry process, e.g., desulfation and sulfation. What also will be discussed is the XAS roadmap and the full-scale user support and collaboration at HXMA.

**Bio |** [Ning Chen](#) is a senior staff scientist and the designated beamline responsible for the Hard X-Ray MicroAnalysis beamline (HXMA) at Canadian Light Source (CLS). Ning obtained his Ph.D. in 2002 at the Department of Geological Sciences, University of Saskatchewan, and worked as postdoctoral fellow at CLS between 2001-2003 before becoming a staff scientist at CLS. He involved in building and commissioning HXMA and is responsible for the beamline operation and XAS user program afterwards. Ning's expertise is X-ray absorption spectroscopy and its application in material and environmental studies.



Ning is committed to making every effort to develop the hard X-ray XAS facility at CLS as a leading center of excellence in synchrotron XAS research, developing user community at his beamline, and promoting XAS both in Canada and internationally. A hypothesis driven and theoretical modeling guided XAS roadmap has been developed at HXMA and promoted throughout HXMA XAS user community, helping users' research effectively and efficiently proceeded at HXMA. Ning deeply involves in supervision and training of HQP as many graduate student XAS users and visiting scientists at his beamline can attest to and collaborates in many scientific and industrial XAS user projects. Outside of his beamline responsibilities, he has adjunct faculty appointments at six Canadian universities [University of Saskatchewan (Geological Sciences and Chemical and Biological Engineering), University of Regina (IEESC), Western University (Mechanical and Materials Engineering), McMaster University (Chemical Engineering), Université du Québec à Trois-Rivières (Chemistry, Biochemistry and Physics), University of Waterloo (Department of Chemical Engineering)] and as Executive Committee Member representing Americas in International X-ray Absorption Society (IXAS) since 2022.

**Contact** | Sixu Deng <[sixu.deng@concordia.ca](mailto:sixu.deng@concordia.ca)>