

Dear colleagues,

We are delighted to invite you to the talk by **Prof. Tsun-Kong (T.K.) Sham** (University of Western Ontario, Canada) on:

Tracking energy materials phase transition, energy storage devices operando, and imaging with tender X-rays

Abstract:

I will report three case studies: (i) phase transition in TiO_2 nanotubes (amorphous to anatase to rutile) tracked with XAS, XEOL and XRD. (ii) the dynamics at the primary and secondary sites during charging and discharging of Li ion batteries with operando XAS and XES on LiFePO_4 cathode and black P anode, respectively. (iii) retrieving clear images from tarnished 19th century daguerreotypes using a tender X-ray microbeam. The implications for a wider application will be discussed.

Biography:



T. K. Sham is a Distinguished University Professor at Western University in Canada and a Fellow of the Royal Society of Canada. He held a Canada Research Chair in Materials and Synchrotron Radiation (2002-2023). T. K. obtained a BSc (honor's, first class) in Chemistry from the Chinese University of Hong Kong, then a PhD in Chemistry from The University of Western Ontario with Professor G. Michael Bancroft. After a postdoctoral fellowship at Western, he joined the Chemistry Department at Brookhaven National Laboratory in 1977 as a Research Associate with Dr Morris L. Perlman and Dr Richard E. Watson, working up the ladder to the rank of Chemist. He returned to Western in 1988 as an Associate Professor, promoted to Professor in 1991. From 1999 to 2008, he was the Director of the Canadian Synchrotron Radiation Facility (CSRF) at the Synchrotron Radiation Center, University of Wisconsin-Madison, helping build synchrotron capabilities and a synchrotron community for Canada. He is a founding member of and a beam team leader at the Canadian Light Source. In 2016, he was appointed Officer of Order of Canada (the highest civilian honor) for his seminal contributions to science and service to the scientific community.

Dr. Sham's research areas are materials and the development and application of synchrotron radiation techniques, especially in tracking the electronic structure and functionalities of materials, and their performance in energy devices. Expertise includes nanostructures, bimetallic and semiconductor materials, surface and interface, photoemission, X-ray absorption, photon-in photon-out (X-ray emission, X-ray excited optical luminescence, resonant and non-resonant inelastic X-ray scattering) and X-ray microscopy. Recent interests are nanostructure phase transition and nano-heterostructures, in situ/operando synchrotron studies of energy devices, X-ray excited optical luminescence in the energy and time domain, nanomaterials for drug delivery, microbeam analysis of cultural heritage materials. In 2018 his group conducted a groundbreaking study in retrieving clean images from tarnished 19th century daguerreotypes (first public photography in history) and most recently, anisotropic crystallization under quantum confinement in TiO_2 nanotubes.

Dr. Sham has published ~ 700 peer-reviewed papers with citations over 44400 and a h-index of 103 (Google Scholar). Accolades include 2025 CIC Medal, the highest honor of the Chemical Institute of Canada in research and scholarship, the Nano Ontario Outstanding Lifetime Achievement Award (2024), CIC Montreal Medal (2023), the highest honor in leadership and community service, the Allen Pratt Award of the Canadian Light Source (2018) for community service, The Hellmuth Prize, top award for research, (2017) and Distinguished University Professorship (2015) from Western, Fellow of the Royal Society of Canada (2012), J. C. Polanyi Award of the Canadian Society for Chemistry (2010), Distinguished Research Professorship from Western (2005), the Award of Merit of the Federation of Chinese Canadian Professionals (Ontario) for contribution to society (2004) and the Florence Bucke Prize of the Faculty of Science at Western (1994). He has mentored many young scientists and engineers; many are university professors, researchers in industry, staff at the Canadian Light Source and synchrotrons in Europe, USA, and China. He has been active in national and international scientific affairs, having served as a member of the Board of Directors for the Canadian Light Source (2001-2006) and Chair (2003-2006) of the International X-ray Absorption Society (IXAS). In 2012, he found the Soochow University - Western University Centre for Synchrotron Radiation Research, a joint effort to promote international collaboration in research and education and served as the director (2012-2023). In 2019, the Canadian Society for Chemistry inaugurated the "Canadian Light Source TK Sham Award in Chemistry of Materials" in his honor. He is also the Chair of the Ontario Synchrotron Consortium, presently working with Canadian Light Source, the Canadian Institute for Synchrotron Radiation (CISR) and the scientific community on a Long-Range Plan for synchrotron research in Canada (<https://www.cisr-icrs.ca/lrp>).

Date and time: **Friday, 28 August 2026, at 1:30 pm.**

Zoom link and credentials for those who are willing to attend online:

<https://helmholtz-berlin-de.zoom-x.de/j/67718034128?pwd=N5RaTz6GX68kLW7hLwTSqGOP9ja5m6.1>

Meeting ID: 677 1803 4128

Passcode: 496540

Location: **Seminar Room WCRC 14.51-3303 ("Aquarium"), Albert-Einstein-Str. 15, 12489 Berlin**

With Best Wishes,
Xuchun Wang, SE-AID