Solving Self-Absorption in Fluorescence and Nanostructure Analysis of Organometallics

Ryan Trevorah

School of Physics, University of Melbourne, Australia

XAS is one of the most popular techniques of synchrotron science and most modern synchrotrons have several dedicated beamlines for this purpose. The overwhelming majority of research in this field measures secondary fluorescence photons emitted by the sample of interest. This type of measurement suffers from the dominant systematic error of self-absorption of the fluorescence photon which compromises accuracy, analysis and insight. This work presents a novel self-consistent methodology to correct for this systematic error. These results represent an enormous improvement over any previous attempt to correct for this systematic error. This method (and accompanying software package) can be applied to any fluorescence XAS data set leading to a widely-applicable general solution.

Bio
Dr. Trevorah has recently completed a PhD focussing on synchrotron science, with a particular interest in the self-absorption systematic seen in fluorescence XAS. Significant progress has recently been made on this topic allowing for exciting new insights to be gleaned from fluorescence data.

Literature

1. **New Features Observed in Self-Absorption-Corrected X-ray Fluorescence Spectra for Ni Complexes with Uncertainties**
   Ryan M. Trevorah, Christopher T. Chantler, and Martin J. Schalken
   The Journal of Physical Chemistry A 2020 *124* (8), 1634-1647
   DOI: 10.1021/acs.jpca.9b10619
2. **Solving self-absorption in fluorescence**
   Trevorah, R. M., Chantler, C. T. & Schalken, M. J. (2019). IUCrJ 6, 586-602.
   https://doi.org/10.1107/S2052252519005128