

X-ray Raman Spectroscopy using the LERIX facility at the APS

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The Lower Energy Resolution Inelastic X-ray Scattering (LERIX) facility, permanently stationed in sector 20 ID-B of the APS, was commissioned and made available to general users in 2006. This instrument was optimized for measurements of momentum dependent X-ray Raman Spectroscopy (XRS) of low-energy excitations from semi-core and core-levels with binding energies from 10 eV to as much as 2000 eV. Taking advantage of the unique traits of this technique, a rich variety of experiments ranging from studies of valence and core excitation in gaseous nitrogen to studies of non-dipole transitions in f-electron systems, from studies of energy storage and fuel cell systems to the genesis of new states of matter under high pressures (generated using a diamond anvil cell, DAC), and from studies of electronic structure of liquid samples to truly bulk sensitive speciation of carbon in soils have been performed, in the past twelve years. In this talk, we will discuss some of the experiments that have been carried out with the LERIX instrument, with emphasis on energy materials, environmental science, high pressure science, and basic chemistry.