

## **The role of AMBER in energy related materials research at LLNL**

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Soft x-ray spectroscopies at the ALS provide a cornerstone of our group's energy materials initiatives at Lawrence Livermore National Laboratory. This talk provides examples of our on-going research at the ALS, with particular emphasis on the enabling capabilities proposed at AMBER. Moreover, we anticipate that all three proposed branches of AMBER will be of tremendous relevance to our group's current and future projects; we illustrate this in this presentation by highlighting three specific on-going projects. For each topic, we discuss our current approach and findings and from there additionally discuss critical upgrades and enhanced capabilities that AMBER is poised to provide. The three thrusts of this talk will cover (1) *in situ/in operando* x-ray absorption spectroscopy of carbon aerogel supercapacitors, (2) catalysis on metal oxide/nanoporous-Au and the role of NEXAFS and APXPS, and (3) *in situ* XAS of LiFePO<sub>4</sub> for batteries and the requirement for spatial resolution provided via STXM. Examples of complementary *ab initio* modeling are also provided.

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