

X-PEEM Probes Biomineral Structures at the Nano-scale

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The ability to collect both spectroscopic and micrographic data simultaneously through the use of the synchrotron based techniques x-ray absorption near-edge structure (XANES) spectroscopy and x-ray photoemission electron microscopy (X-PEEM) enables an unprecedented view into biomaterials such as biominerals. Biominerals are complex composite materials consisting of both mineral and organic components that are arranged in unique and extraordinary structures. Here we present work done at the Synchrotron Radiation Center (SRC) that demonstrates the ability of X-PEEM and XANES to detect calcium carbonate polymorph and the orientation of individual calcium carbonate crystals within biomineral systems. In using these capabilities of X-PEEM and XANES spectroscopy we are able to obtain great insight into the biomineral systems being studied.