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Small angle light scattering as a micron-scale structural probe of porosity[1] GREGGORY MCPHERSON, New Mexico State University — The ability to characterize and measure changes to the pore structure of materials across multiple length scales as a function of physical or chemical processes is of interest for many energy storage, industrial filtration, and environmental remediation applications. Ultra-small and small-angle x-ray and neutron scattering are effective structural probes for features from roughly 1 nm to 1 m, but as some pore structures can span 7 orders of magnitude, a structural probe for micron length scales is required. Employing longer wavelengths, small-angle light scattering (SALS) is able to probe structural features from one to hundreds of microns, bridging the gap in accessible Q between USANS/USAXS and quantitative analysis of electron micrographs. Though SALS has been well developed for studying polymers and biomolecules, its application to multiphase bulk solids is less established. A SALS instrument was designed and built in collaboration with the Geochemistry and Interfacial Sciences group at ORNL. The calibration of this instrument and its ability to characterize pore structure in thin sections of sandstone will be discussed. The use of this technique in finding changes in water's structure with micron-scale confinement is also assessed.

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