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Ultra-Small-Angle X-ray Scattering (USAXS) Imaging to Complement USAXS Analysis. G.G. Long, Argonne National Laboratory, L.E. Levine, National Inst. of Standards and Technology.

The small-angle x-ray scattering contrast mechanism provides inherently high contrast of density variations within a sample. We have developed USAXS imaging to make use of this contrast mechanism to complement small-angle x-ray scattering by identifying the source of the measured scattering. Small-angle scattering data is highly valued for its ability to provide statistically significant information about materials structure in the 1 nanometer to 1 micrometer size range. However, it offers almost no information as to how that microstructure is arranged. USAXS imaging provides needed information on the shapes and three-dimensional arrangement of the scattering objects. And finally, it offers a measure of integrity to a scattering analysis by indicating when artifacts such as sample surface scattering or double Bragg diffraction are present, and an opportunity to avoid them.