



Applications of grazing incidence SAXS (GISAXS) and anomalous SAXS (ASAXS) in materials research

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Due to the surface selectivity, grazing incidence small-angle x-ray scattering (GISAXS) combined with the intense and collimated synchrotron radiation sources is a powerful and widely used technique for structural investigation of nanoclusters deposited on, or buried near to, the surface of flat substrates. By tuning the incidence angle above the critical angle of total reflection, the penetration of x-rays in the sample can be adjusted to reach clusters buried at different depths (typically up to few hundreds of nm). From the GISAXS intensity, parameters like: size, size dispersion, shape, number density, as well as ordering of clusters can be determined. Another technique developed fast in the last years as a consequence of the availability of synchrotron radiation sources, which beside the high intensity provide photons over a wide energy range, is the anomalous small-angle x-ray scattering (ASAXS). This technique is based on the fact that for x-rays whose energy is close to the absorption edge of an element, the atomic scattering factor of that element is reduced by a few electrons as compared with their value far from the edge. As a consequence, a contrast variation in the scattering intensity selective to a given chemical element can be obtained by simply varying the energy of the incident x-rays photons. An introductory course describing the capabilities of both techniques will be presented.