

SOLID-SUPPORTED ALIGNED NANOSTRUCTURES PROBED BY SYNCHROTRON AND LABORATORY-GISAXS.

Manfred Kriechbaum*, Milos Steinhart[§], Heinz Amenitsch and Peter Laggner*
Institute of Biophysics and Nanosystems Research, Austrian Academy of Sciences,
Graz, Austria and *) HECUS X-ray Systems, Graz, Austria.

§) Institute of Macromolecular Chemistry, Czech Academy of Sciences, Prague,
Czech Republic.

Supramolecular self-assemblies of amphiphilic molecules or surfactant mediated mesoporous materials can be deposited as ordered nanostructure films on planar solid surfaces (e.g. Si-wafers). The quality and regularity of such solid-supported nanostructures can be routinely assessed by GI-SAXS (grazing-incidence small-angle X-ray scattering). These ordered assemblies might also undergo structural phase-transitions when changing temperature, pressure or hydration. However, does the nanostructure after such phase transitions, e.g. from a simple 1-D lamellar lattice to a complex 3-D cubic lattice, preserve its orientational order with respect to the solid surface it is attached to? To answer this question we have performed a series of GI-SAXS experiments at the synchrotron source ELETTRA with aligned lyotropic lipid films by driving them through phase transitions by changing T, p or hydration.

Recently we also succeeded in performing GI-SAXS experiments with a laboratory based SAXS camera equipped with a dedicated sample holder and a 2D CCD-detector. That way we were able to measure the surface diffraction of oriented mesoporous material or lyotropic phospholipids in Laue condition at fixed angle of 5°.