

Small-angle X-ray scattering (SAXS) off parallel, cylindrical, well-defined nanopores: from random pore distribution to highly ordered samples.

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We report on the structural characterization of two mesoporous systems: randomly distributed parallel pores in polycarbonate (ITPC) and ordered parallel pores in alumina (npAlox). Both systems are investigated with small-angle X-ray scattering (SAXS) using a two-dimensional detector. A method is described to analyze the anisotropic scattering patterns. The data are fitted using model functions based on accepted models for cylindrical pores. We receive a quantitative description of the patterns. Parameters used in the model function are directly related to the physical properties of the samples. In particular it is possible to describe the scattering curve for less perfectly ordered pores in alumina with the help of a structure factor for an inhomogeneous hard-disc fluid mixture.