

Cylindrical nanochannels in ion-track polycarbonate membranes studied by small-angle X-ray scattering

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Different types of polycarbonate foils were irradiated with 1.4 GeV Xe ions, ultra-violet (UV) treated and subsequently etched, creating cylindrical pores of high aspect ratio. The pores are perfectly well aligned and represent excellent objects for small-angle X-ray scattering. Two-dimensional scattering spectra exhibit highly anisotropic patterns with clear presentation of numerous oscillations of the Bessel function, the radial part of the scattering function. Modelling the pores as parallel cylinders allows us to deduce the pore radius and the radius dispersion as a function of UV treatment, etching time and fluence. It is demonstrated that the UV treatment has a beneficial influence on the poresize distribution, in particular for small pores.