Smectic ordering in side-chain liquid crystalline polymers (LCPs) and in LCP-silica nanocomposites

Françoise Ehrburger-Dolle, LSP (UMR5588 CNRS-UJF), Saint Martin d'Hères, France.

The mesophase behavior of a side chain liquid crystalline polyacrylate LCP grown by drying a solution has been investigated. This LCP characterised by a short spacer (4 carbon atoms) and a long tail (10 carbon atoms) displays, at increasing temperatures, SmC and SmA_d phases. The effect of the mean molecular weight, *i.e.*, the mean number of side chains per polyacrylate main chain (18 and 51) on the lamellar width was studied. LCP-silica nanocomposites have been synthesised by a sol-gel process in presence of LCP in the solution, followed by subcritical drying. The mesophase behaviour of these nanocomposites was compared to that of the corresponding bulk LCP. The experimental methods were polarised optical microscopy, differential scanning calorimetry and synchrotron X-ray scattering.

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