

Reorientation of nematic liquid-crystals and liquid-crystalline polymers in an electric field studied by FT-IR time-resolved spectroscopy and 2D-correlation analysis.

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Streszczenie

Fourier-transform infrared (FT-IR) time-resolved spectroscopy was used to study the segmental mobility of two low molecular weight nematic liquid-crystals (*p*-cyanophenyl *p*-(*n*-hexyl)benzoate, 6CPB, *p*-cyanophenyl *p*-(*n*-heptyl)benzoate, 7CPB) and a nematic liquid crystalline polymer (poly[*p*-(*n*-hexyl)(*p*-(cyanophenyl)benzoate) acrylate], NLCP), which has a 6CPB unit in the side chain. Of particular interest was the comparison between the reorientation of free 6CPB and 6CPB integrated in the side chain of the polymer. The samples were studied under different experimental conditions of temperature, voltage, and prealignment. To accentuate and derive more useful information from the original time-resolved spectra, we applied 2D-correlation analysis. It has been shown that molecules of 6CPB and 7CPB reorient as rigid units. In the case of NLCP only the mesogen and a small part of the spacer, directly attached to the mesogen, participate in the reorientational movement; the rest of the spacer and the main chain do not move under the influence of the electric field. The temperature, in a narrow range, and the prealignment do not have a noticeable effect on the rate of reorientation of the nematic low molecular weight liquid-crystals, whereas increasing temperature and prealignment significantly shorten the relaxation times of the NLCP.

Słowa kluczowe

Absorption, Chromatography, Molecules, Polymers, Power

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