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Phase diagram and molecular dynamics in the antiferroelectric liquid crystal (2S)-octano-2-yl-4'-(2-fluoro-4-{[5-(1,1,2,2,3,3,3 heptafluoropropoxyy)pentylo]oxy}benzoyloxy)-[1,1'-biphenyl]-4-carboxylate

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The phase diagram and molecular dynamics of (2S)-octano-2-yl-4'-(2-fluoro-4-{[5-(1,1,2,2,3,3,3 heptafluoropropoxyy)pentylo]oxy}benzoyloxy)-[1,1'-biphenyl]-4-carboxylate (2F5) were studied for samples which were exposed to various thermal treatment. 2F5 is composed of the chiral molecules and shows rich polymorphism of liquid-crystalline and solid phases. Studies by means of Differential Scanning Calorimetry (DSC) and polarizing microscopy (POM) revealed the following phase sequence: ferroelectric smectic C- (SmC^*), antiferroelectric smectic C (SmC^*_A), smectic A (SmA^*) and the glassy phase of SmC^* ($GSmC^*_A$). Additionally, on slowly heating (< 2 K/min) a „cold crystallization"was observed. The molecular dynamics of 2F5 in various mesophases and on approaching of the glass transition temperature was studied by broadband dielectric spectroscopy (BDS). The glass transition temperature (T_g) determined from BDS studies and DSC measurements coincides with the value estimated based on observation of cracks in polarizing microscopy textures. The bias field was applied to identify the mechanism of complex dynamics (molecular and collective).

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