Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

Supporting Information

Dynamics and Ionic Conductivity of Ionic Liquid Crystals Forming a Hexagonal Columnar Mesophase

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Havriliak-Negami (HN) function to the experimental data

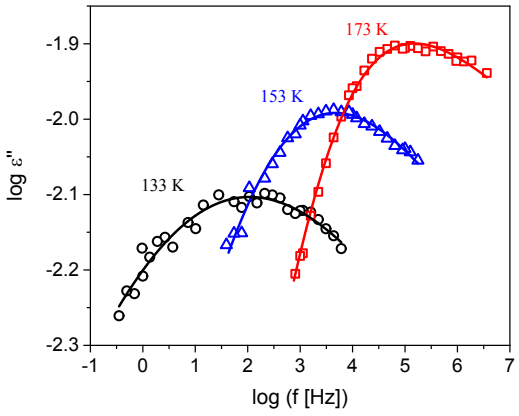

Figure S1. Frequency dependency of dielectric loss of LC536 for the second heating at different temperatures as indicated. Solid lines denote the fit by the HN-function to the corresponding data.

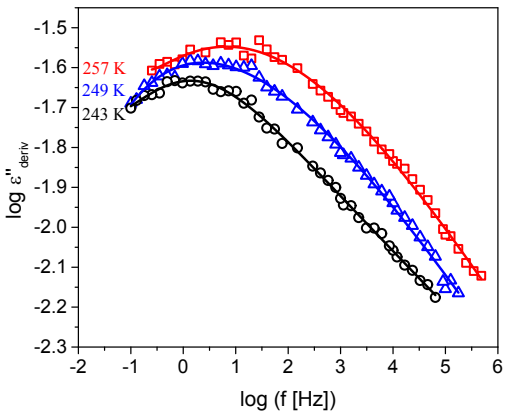

Figure S2. Frequency dependency of ε''_{deriv} of LC537 for the second heating at the indicated temperatures (α-process). Solid lines are the fits of the HN-function given in Eq.5 to the data.

Additional experimental results

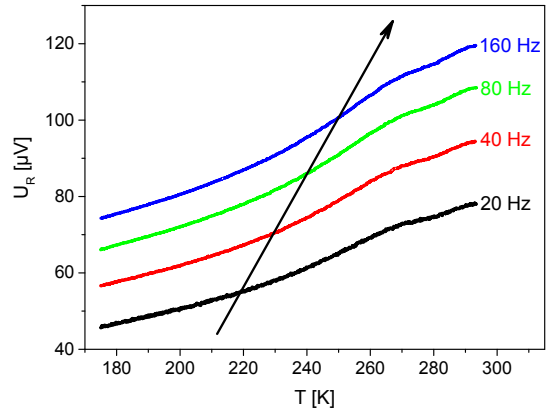

Figure S3. Temperature dependence of the real part of the complex differential voltage of LC537 during the cooling run at different frequencies as indicated. Black arrow - guide for the eyes.

Fitting parameters of VFT and Arrhenius equations fitting to the conductivity data

VFT parameters and activation energies estimated from the fittings to the conductivity processes probed by BDS is given in Table S1. It is worth to note that the VFT fitting parameters are given only for the cooling runs due to the broader temperature range obtained for the σ_{DC} values for the cooling runs. Moreover, $\log(\sigma_\infty$ [S/cm]) was fixed to 1.3 for the cooling run of LC537 since the broader temperature range is obtained for the σ_{DC} values for LC536, and $\log(\sigma_\infty$ [Hz]) was found to be 1.3 ± 0.2 from free fitting of VFT-equation to the data for LC536.

Table S1. VFT parameters and activation energies estimated from the fittings to the BDS data. To reduce the number of free fit parameters, $\log(\sigma_\infty$ [Hz]) was fixed to 1.3 for LC537.

Material	**Run**	**VFT (Col_h phase)**		**Arrhenius (Cry_1 phase)**	
		$\log(\sigma_\infty$ [S/cm])	**T_o [K]**	**$\log(\sigma_\infty$ [S/cm])**	**E_A [kJ/mol]**
LC536	1st Heating	-	-	2.4 ± 0.4	87 ± 2

	1st Cooling	1.3 ± 0.2	179 ± 3	2.3 ± 0.6	87 ± 3
	2nd Heating	-	-	2.6 ± 0.4	89 ± 3
	1st Heating	-	-	1.3 ± 0.6	85 ± 5
LC537	1st Cooling	1.3	168 ± 2	1.2 ± 0.5	83 ± 3
	2nd Heating	-	-	1.2 ± 0.3	84 ± 2