

Cite this: DOI: 00.0000/xxxxxxxxxx

Supplementary information for Microrheology to Probe Smectic Clusters in Bent-core Nematic Liquid Crystals

Sathyanarayana Paladugu^{a,b,*}, Supreet Kaur^c, Golam Mohiuddin^c, Ravi Kumar Pujala^b, Santanu Kumar Pal^c, and Surajit Dhara^{a,‡}

Received Date
Accepted Date

DOI: 00.0000/xxxxxxxxxx

Temperature dependent birefringence, order parameter and dielectric constants of the two compounds are presented here.

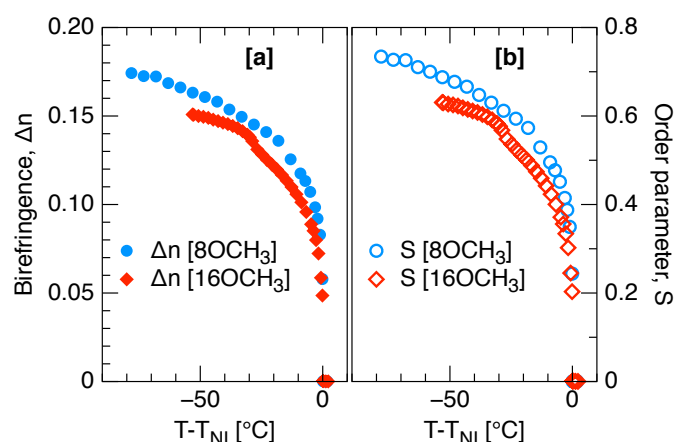


Figure S1 [a] Temperature variation of birefringence (Δn) and [b] order parameter (S) of compounds.

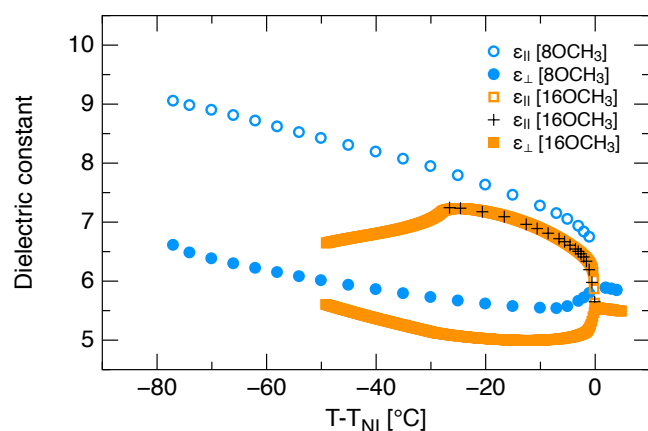


Figure S2 Temperature dependent dielectric constants of the compounds measured at a frequency 4111 Hz. Plus symbols indicate $\epsilon_{||}$ obtained by extrapolating the voltage dependent dielectric constant.

1 Physical Properties

1.1 Birefringence and Order parameter

The temperature dependent birefringence (Δn) of compounds 8OCH_3 and 16OCH_3 is shown in figure S1[a]. In both compounds, Δn emerges abruptly at the N-isotropic phase transition as expected and gradually increases as the temperature lowered. In compound 16OCH_3 , a small slope change in Δn is observed at $T - T_{NI} = -29^\circ\text{C}$, indicating N-Sm-A phase transition. The temperature dependent birefringence in the nematic phase can be approximated by the formula $\Delta n = \Delta n_0(1 - T/T^*)^\beta$, where T^* and β are the adjustable fit parameters and Δn_0 is the birefringence of the perfectly aligned sample. The equation fits well in the entire nematic range with fit parameters $\Delta n_0 = 0.24$ and $\beta = 0.18$ for 8OCH_3 and $\Delta n_0 = 0.24$ and $\beta = 0.23$ for 16OCH_3 . The order parameter obtained using the relation $S = \Delta n/\Delta n_0$, is also shown in figure S1[b].

1.2 Dielectric constants

The temperature dependent dielectric constants, parallel ($\epsilon_{||}$) and perpendicular (ϵ_{\perp}) to the director are shown in figure S2. The dielectric anisotropy is positive for both the compounds. At the N-SmA transition temperature, $\epsilon_{||}$ in compound 16OCH_3 is reduced slightly.

^aSchool of Physics, University of Hyderabad, Hyderabad, India.

^bDepartment of Physics, Indian Institute of Science Education and Research (IISER) Tirupati, Tirupati, India.

^cDepartment of Chemical Sciences, Indian Institute of Science Education and Research (IISER) Mohali, Sector-81, Knowledge City, Manauli, 140306, India.

* Email: sathyapaladugu@gmail.com

‡ Email: sdsp@uohyd.ernet.in