Electronic supplementary information (ESI) for-

Synthesis, characterisation and charge transport properties of a λ-shaped trimer nematogen†

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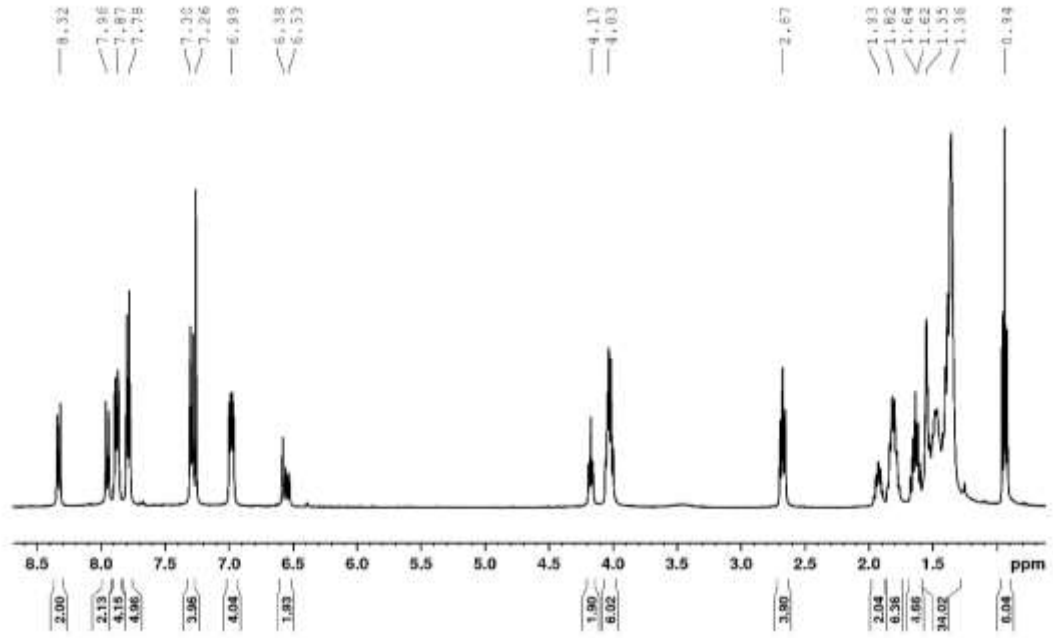
Figure S1. ^{1}H NMR spectrum of the λ-shaped tris azo trimer (4Az λ10NO_2) in $CDCl_3$.



^{1}H NMR (400 MHz, δ ppm, $CDCl_3$): ^{1}H NMR (400 MHz, δ ppm, $CDCl_3$): 8.32 (d, *J* = 8.9 Hz, 2H, Ar-H), 7.96 (d, *J* = 8.9 Hz, 2H, Ar-H), 7.88 (dd, *J* = 2.7 and 9.0 Hz, 4H, Ar-H), 7.79 (dd, *J* = 8.8 and 2.1 Hz, 5H, Ar-H), 7.30 (d, *J* = 8.8 Hz, 4H, Ar-H), 6.99 (dd, *J* = 2.8 and 9.0 Hz, 4H, Ar-H), 6.58 (s, 1H, Ar-H), 6.54 (dd, *J* = 9.0 Hz and 2.1 Hz, 1H, Ar-H), 4.17 (t, *J* = 6.0 Hz, 2H, -O-CH_2-), 4.09-3.97 (t, *J* = 5.9 Hz, 6H, 3 × -

O-C<u>H</u>$_2$-), 2.67 (t, 4H, 2 × Ar-C<u>H</u>$_2$-), 1.86-1.97 (m, 2H), 1.87-1.75 (m, 6H), 1.69-1.58 (m, 4H), 1.44-1.58 (m, 12H), 1.30-1.43 (m, 16H), 0.94 (t, J = 6.4 Hz, 6H, 2 × -C<u>H</u>$_3$);

Elemental Analysis: Calc. for $C_{64}H_{81}N_7O_6$: C, 73.60; H, 7.82; N, 9.39; O, 9.19; found: C, 73.56; H, 7.80; N, 9.34; O, 9.16 %;

Figure S2. ^{13}C NMR spectrum of the λ-shaped tris azo trimer (4Az λ10NO$_2$) in CDCl$_3$.

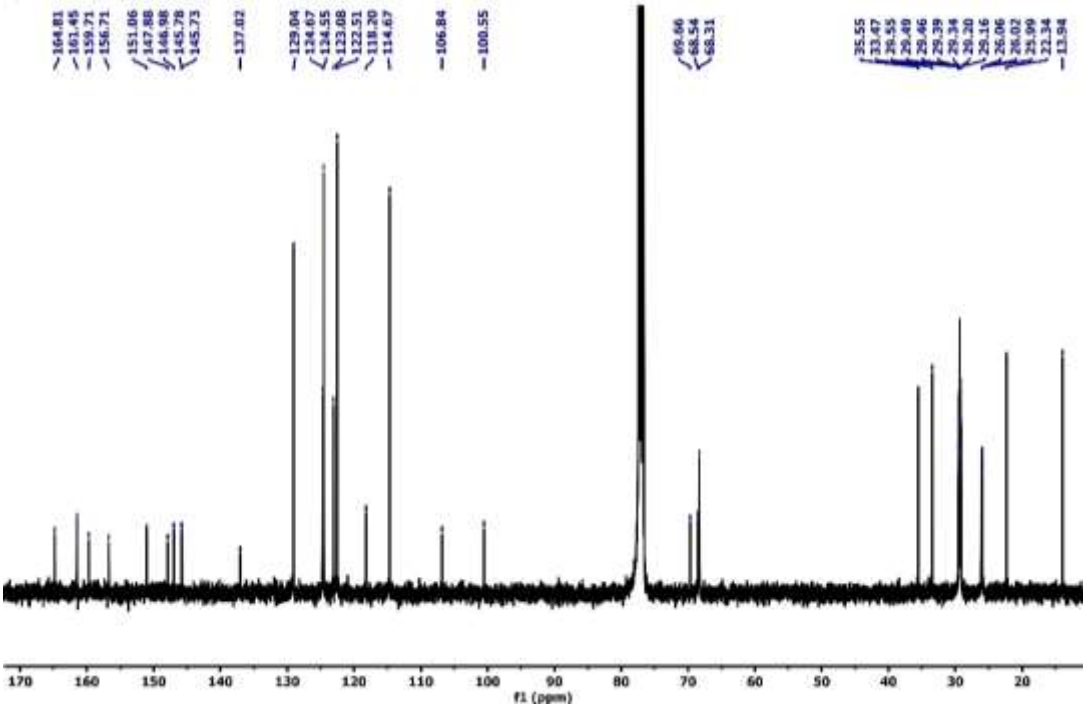
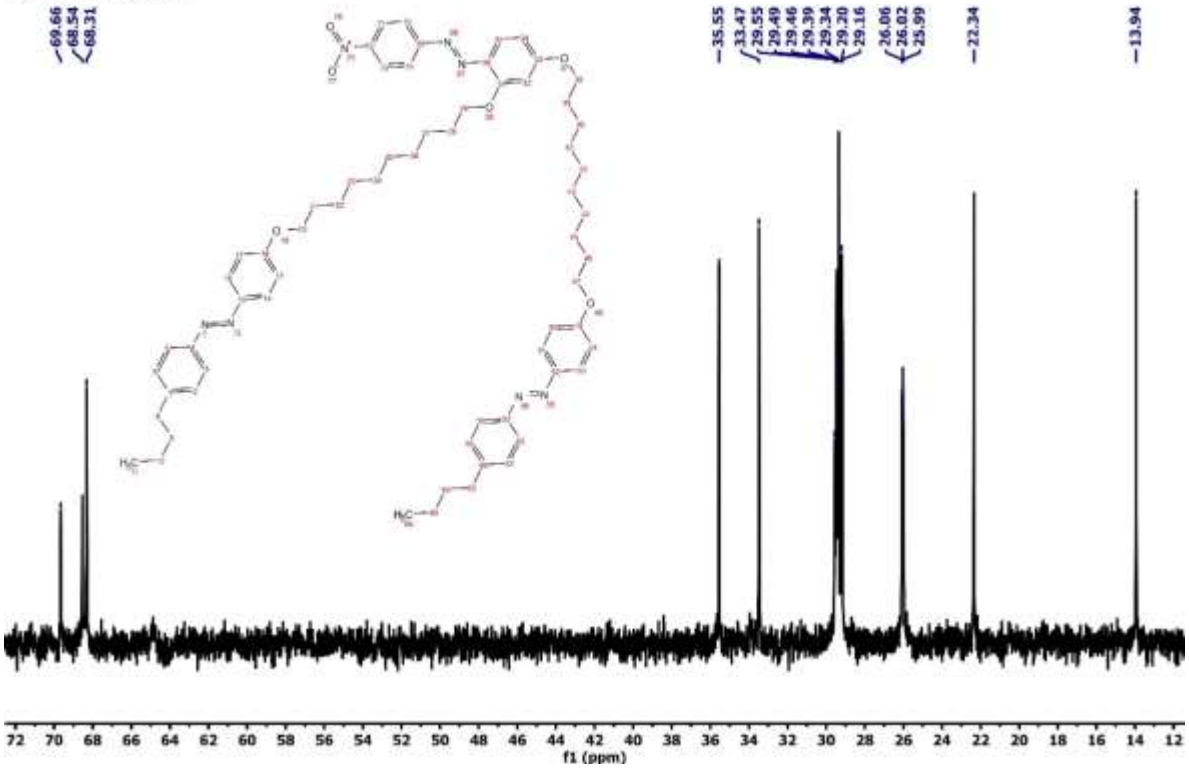


Figure S3. ^{13}C NMR spectrum of the λ-shaped tris azo trimer (4Az λ10NO$_2$) in CDCl$_3$.

^{13}C NMR (100 MHz, δ ppm, CDCl$_3$): 164.81, 161.45, 159.71, 156.71, 151.06, 147.88, 146.98, 145.78, 145.73, 137.02, 129.04, 124.67, 124.55, 123.08, 122.51, 118.20, 114.67,106.84, 100.55, 69.66 (-O-C<u>H</u>$_2$), 68.54 (-O-C<u>H</u>$_2$), 68.31 (-O-C<u>H</u>$_2$), 35.55, 33.47, 29.55, 29.49, 29.46, 29.39, 29.34, 29.20, 29.16, 26.06, 26.02, 25.99, 22.34, 13.94 (-C<u>H</u>$_3$).

13C Produit FD 4Azlambda10NO2
(C64H81N7O6) CDCl3



13C Produit FD 4Azlambda10NO2
(C64H81N7O6) CDCl3

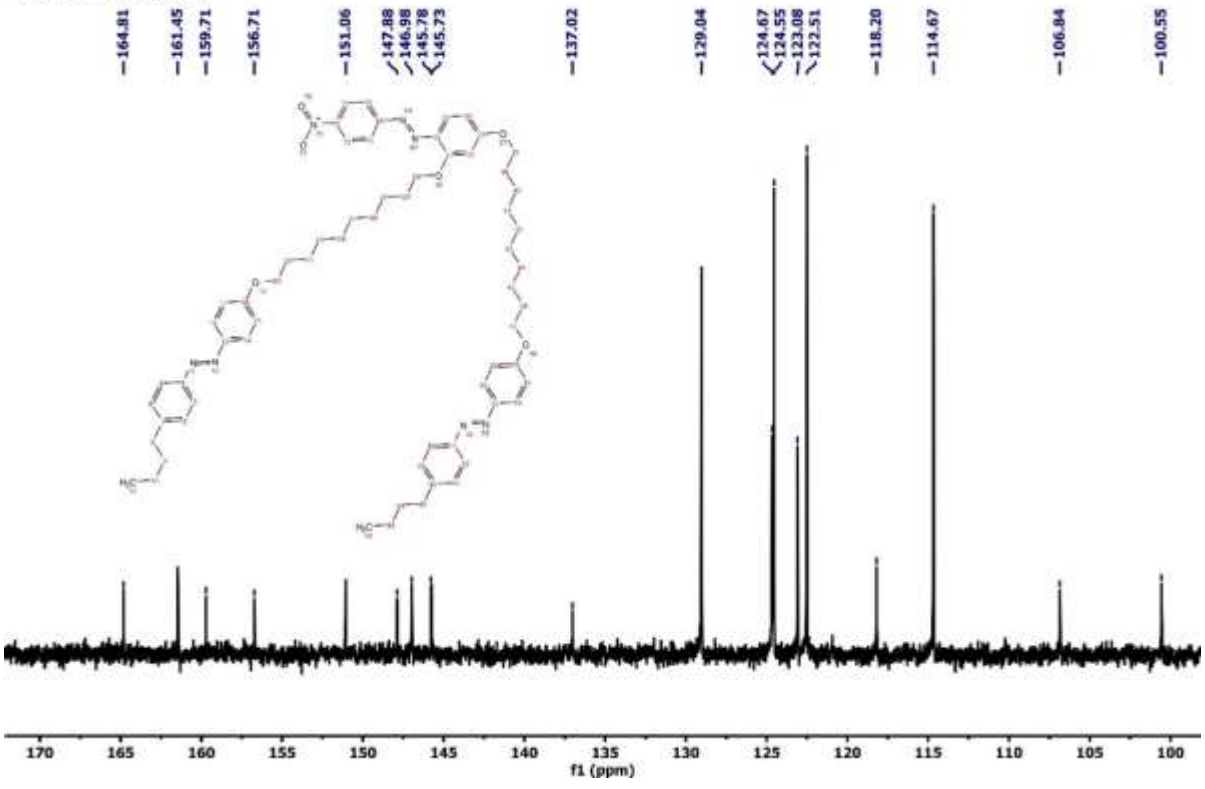
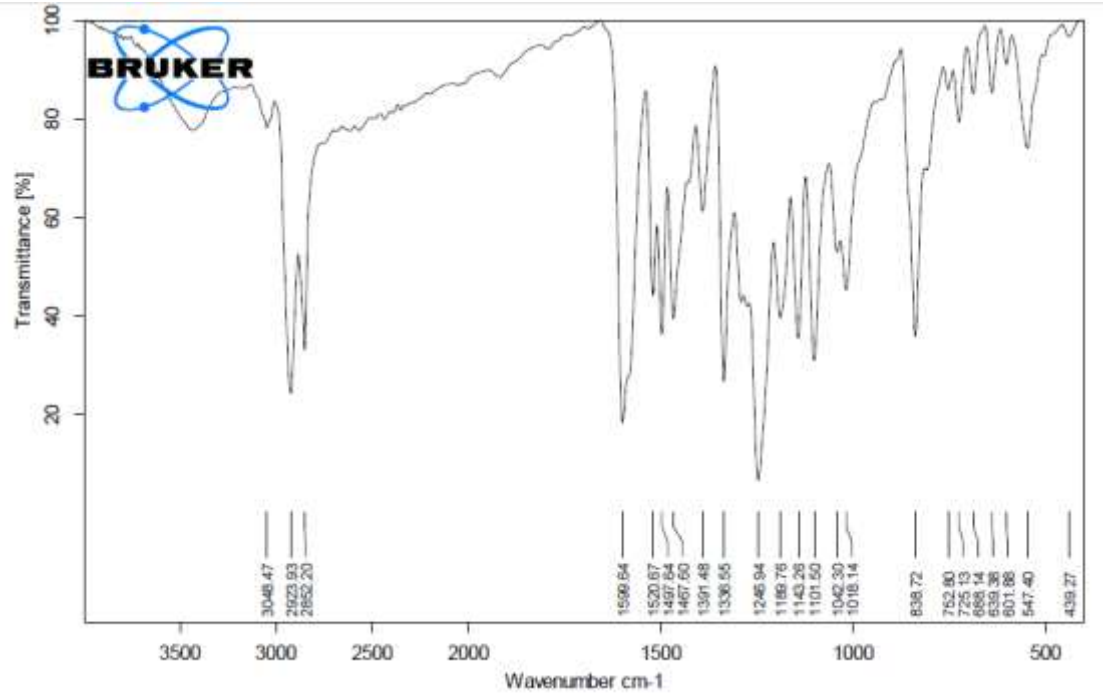
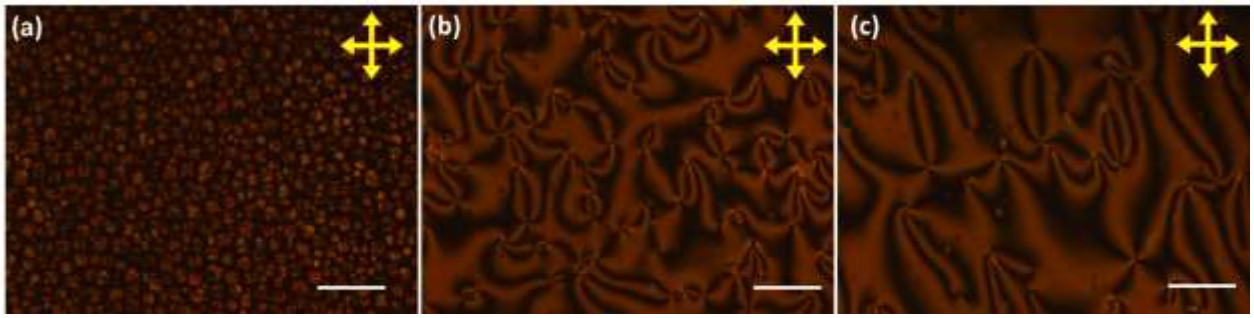


Figure S4. FTIR spectrum of the λ-shaped tris azo trimer (4Az λ10NO_2) nematogen.[1]



FTIR-4Azλ10NO_2: Red brown solid, Yield: 68%; M.P.: 125.5 °C; **IR** ν_{max}/cm^{-1}: 3048.47, 2923.93, 2852.20 (C_{sp3}-H), 1599.64 (-N=N-), 1520.67 and 1336.55 (-N-O- symmetric and asymmetric stretching), 1246.94 (C-O), 1143.26 (C-N), 838.72 (aromatic C-H).

Figure S5. Polarized optical micrograph of the λ-shaped tris azo trimer (4Az λ10NO_2) nematogen exhibiting defects characterized by twofold (s = ± 1/2) and fourfold (s = ± 1) brush-like structures.[2]



It has been observed that the value of dielectric permittivity increases with increasing temperature for the frequencies < 1k Hz. Additionally, the ac conductivity has been found to be temperature dependent showing a clear discontinuity at the N-isotropic phase transition.

Figure S6. (a) Dielectric permittivity and (b) ac conductivity of the λ-shaped tris azo trimer (4Az λ10NO_2) compound.[3]

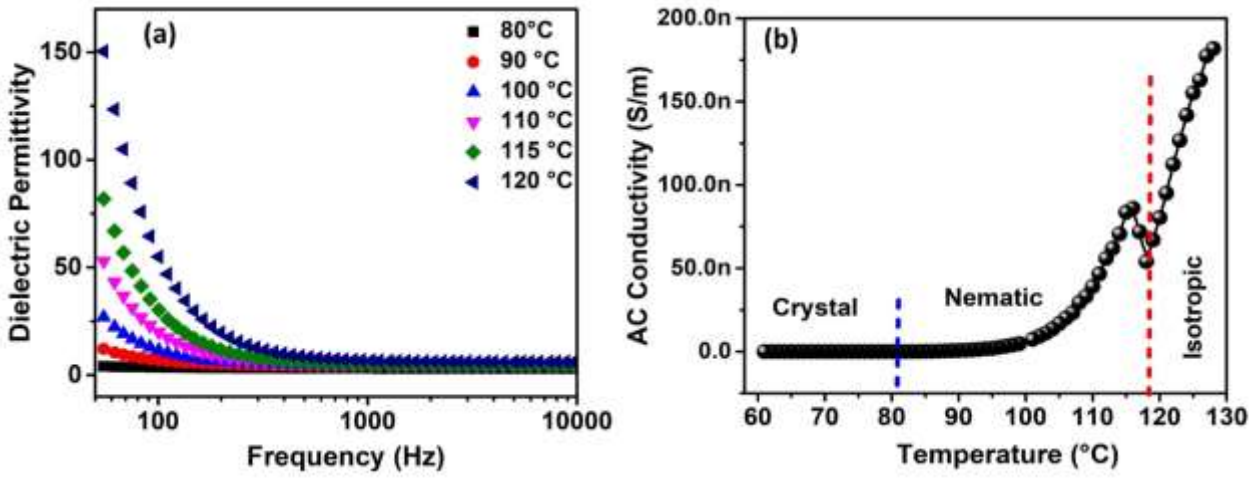
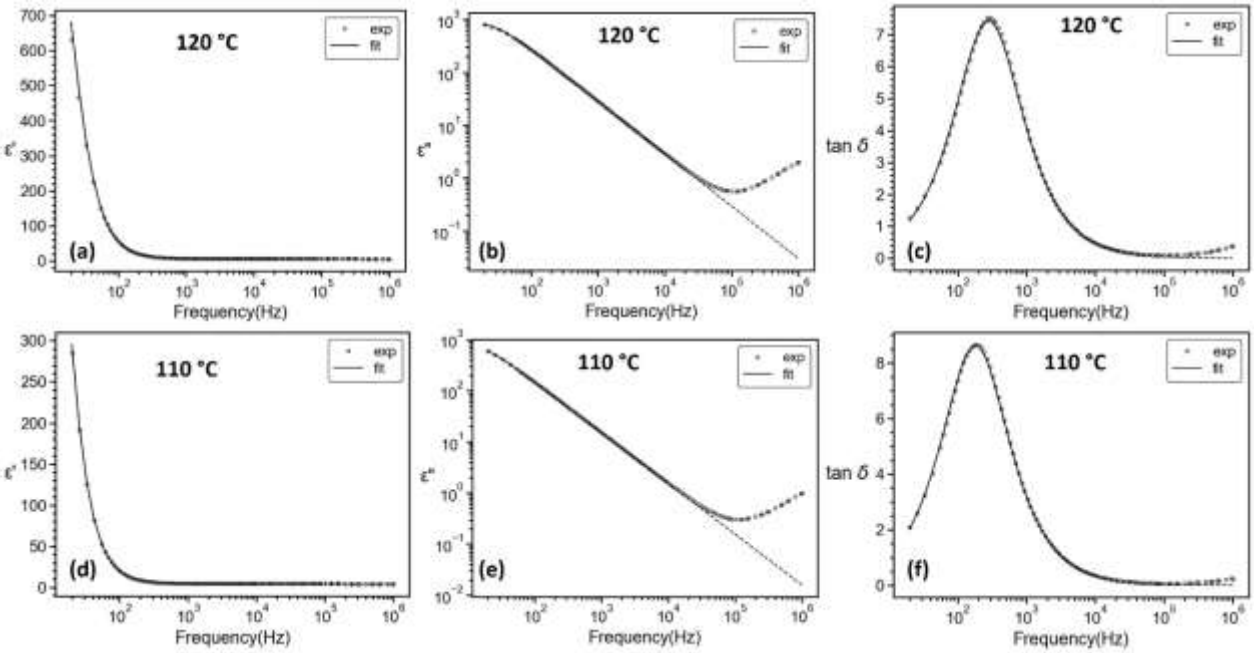


Figure S7. Fitting of dielectric parameters (ε', ε" and Tan δ) at 120 and 110 °C.



References:

1. M. Rabari, S. Solanki and A. K. Prajapati, *Dyes and Pigments*, 2023, **220**, 111757.
2. I. Dierking, in *Textures of Liquid Crystals*, John Wiley & Sons, Ltd, 2003, pp. 51–74.
3. R. Manohar, A. K. Misra, D. P. Singh, S. P. Yadav, P. Tripathi, A. K. Prajapati and M. C. Varia, *Journal of Physics and Chemistry of Solids*, 2010, **71**, 1684–1689.