

## Supporting Information

# Helical Columnar Phase of Mesogen-Jacketed Liquid Crystal Polymers for Efficient Circularly Polarized Luminescence

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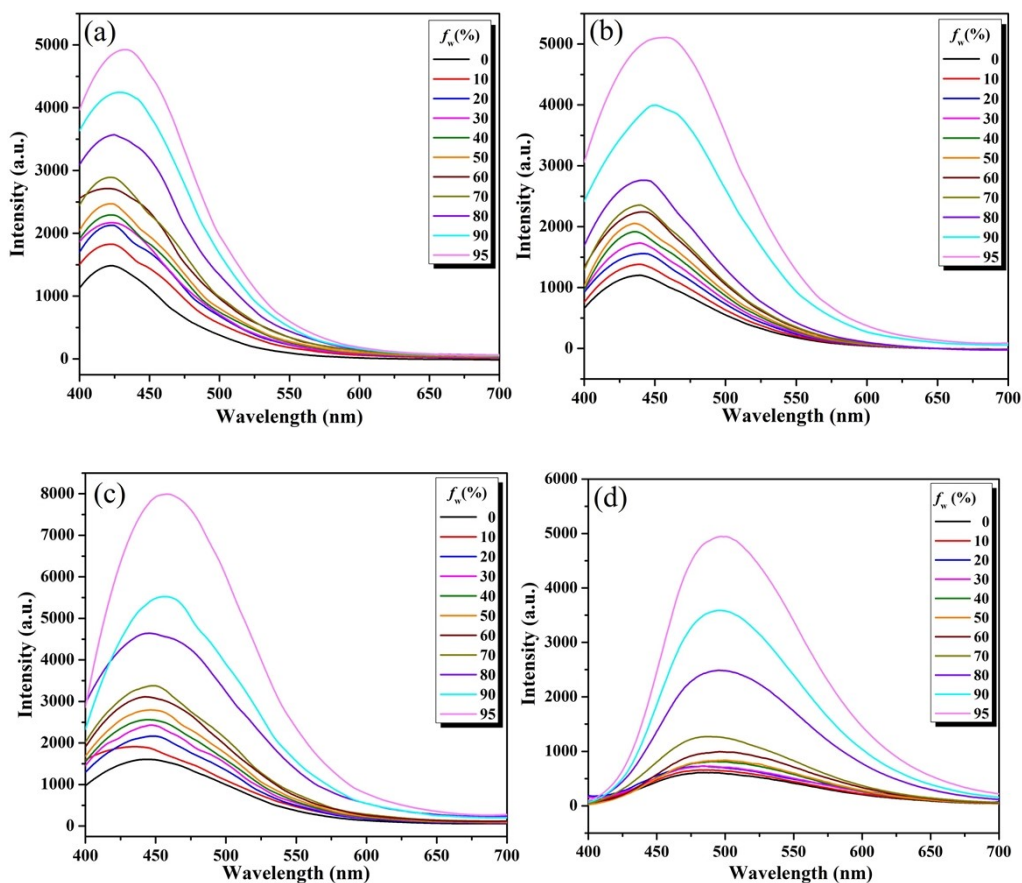
### Materials

p-Hydroxybenzaldehyde (99%), 1-bromododecane (99%), 4-hydroxybenzyl cyanide (99%), dicyclohexylcarbodiimide (99%), 4-dimethylaminopyridine (98%) were purchased from Shanghai Aladdin Biochemical Technology Co., Ltd. and used without further purification. Anhydrous magnesium sulfate ( $\text{MgSO}_4$ , 99%), anhydrous potassium carbonate ( $\text{K}_2\text{CO}_3$ , 99%), potassium iodide (KI, 99%), dichloromethane (99.5%), chloroform (99.5%) and other solvent were obtained from Xilong Scientific Co., Ltd.

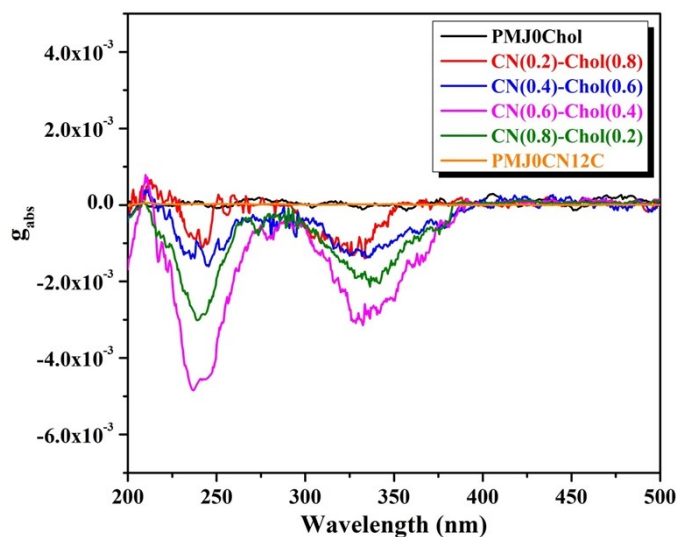
### Measurements and characterizations

The  $^1\text{H}$  NMR spectra of intermediates, monomers and polymers were measured by a Bruker ARX 400 MHz spectrometer. The molecular weight of intermediates and monomers were determined by Bruker Biflex III MALDI-TOF spectrometer. The

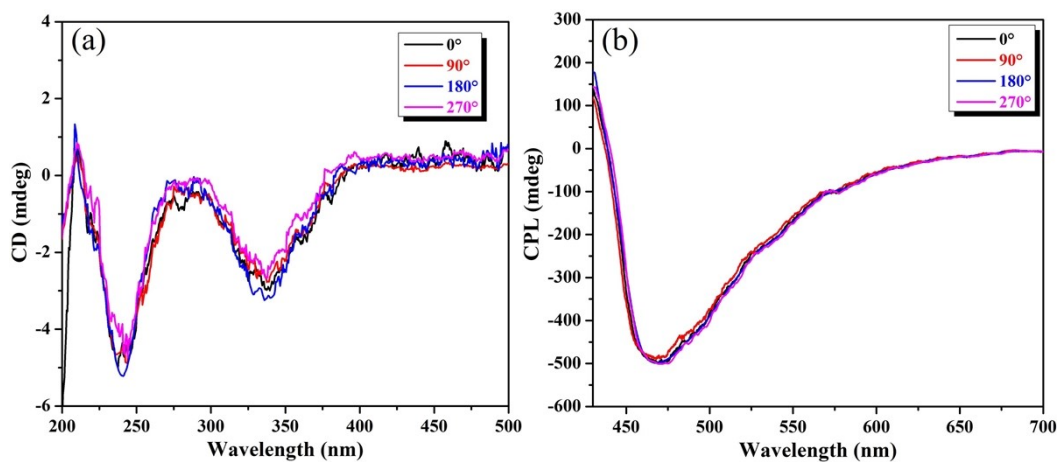
molecular weight and polydispersity index of polymers were measured by WATERS 1515 GPC. The thermal stability of polymers was measured by the TA Q50 instrument under the N<sub>2</sub> atmosphere with a heating rate of 20 °C/min. The phase textures and its change of polymers during the heating and cooling process were characterized by a Leica DM 4500 P polarizing microscope instrument (POM) with Linkam hot stage. The phase transition temperature of polymers was measured by a TA Q10 DSC instrument under N<sub>2</sub> atmosphere. To eliminate the thermal history, all the samples were firstly heated to 270°C and then cooled to -20°C under N<sub>2</sub> atmosphere at a rate of 20 °C min<sup>-1</sup>. The DSC curves during the second heating process at a heating rate of 10 °C min<sup>-1</sup> were recorded. The phase structure of polymers was confirmed by a high-flux X-ray instrument (SAXSess mc2, Anton Paar) equipped with a Kratky block collimation system and a GE ID3003 sealed-tube X-ray generator (Cu Ka). The UV-vis absorption spectra of samples were tested by the Agilent Cary 60 instrument. The FL emission spectra of samples were tested by the F-4600 instrument. The CPL emission spectra of samples were tested by the Jasco CPL-300. The CD spectra of samples were tested by the Jasco J-1700.



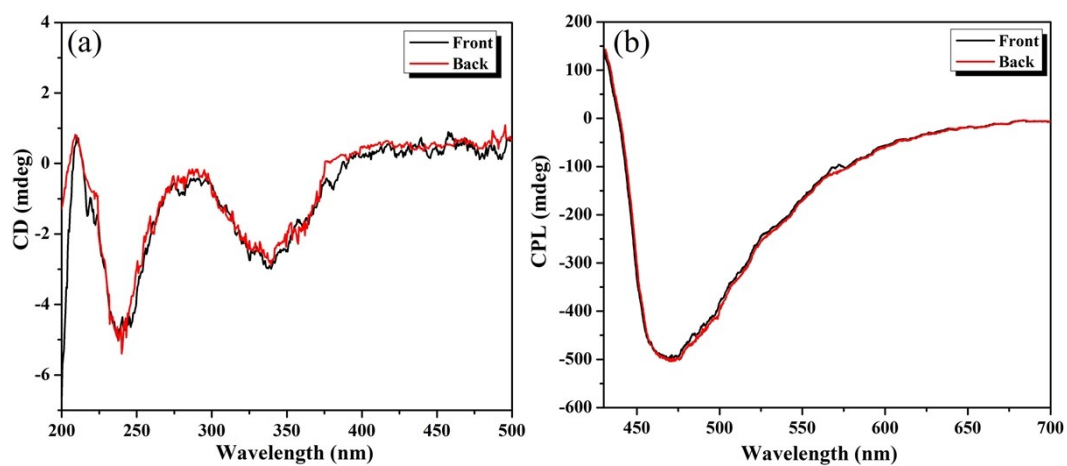
**Figure S1.** Emission spectra of (a) CN(0.2)-Chol(0.8), (b) CN(0.6)-Chol(0.4), (c) CN(0.8)-Chol(0.2) and (d) PMJ0CN12C in THF/H<sub>2</sub>O mixtures with different water volume fraction.



**Figure S2.** The fitted  $g_{abs}$  values of polymer films.



**Figure S3.** The (a) CD and (b) CPL spectra of CN(0.6)-Chol(0.4) at different rotation angle.



**Figure S4.** The (a) CD and (b) CPL spectra of the front and back surfaces of CN(0.6)-Chol(0.4) film.