

Supporting Information

Preparation and Properties of Circularly Polarized Luminescent Liquid Crystal Physical Gels with Self-Supporting Performance

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1. General Experimental Details

1.1 Materials

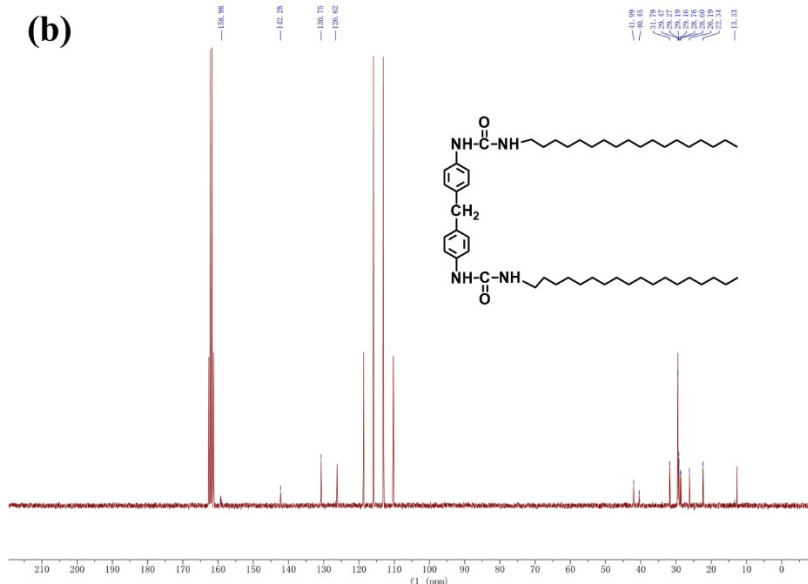
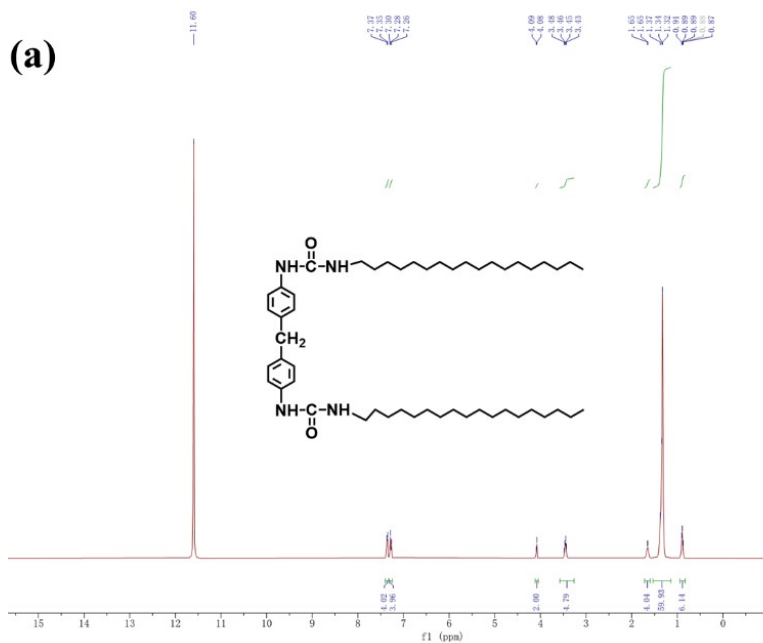
6-Bromo-1-hexanol (97%), 4-nitrophenylacetonitrile (98%), pyrrolidine (99%), *p*-hydroxybenzaldehyde (99%), cholesteryl chloroformate (98%), 4-dimethylaminopyridine (DMAP) (98%), methylene diphenyldiisocyanate (98%) and octadecylamine (99%) were purchased from the Energy Chemical Co., Ltd. 4-Cyano-4'-pentyl biphenyl (5CB) was purchased from Yantai Derun liquid crystal materials Co., Ltd. All organic solvents were purchased from Aladdin and were used directly without further purification.

1.2. Measurements and characterizations

¹H NMR and ¹³C NMR spectra were recorded on a Bruker ARX 400 MHz spectrometer, and CF₃COOD was used as solvent. The mass spectra (MS) were measured on a Bruker Biflex III MALDI-TOF spectrometer using CF₃COOD as solvent. The minimum gelation concentration (MGC) of gelator and the gel-

sol transition temperature (T_{GS}) of the obtained liquid crystal physical gels were measured by a “tube-test” method: gelator MDI-C₁₈, chiral luminescent molecule NO₂-CS-C₆-Chol and 5CB were added into a glass bottle with a given quality ratio (the total mass is 1.0 g). The glass bottle was heated to 160°C, and then MDI-C₁₈ and NO₂-CS-C₆-Chol were dissolved into 5CB completely to form a transparent solution. The glass bottle was removed from heat and then was natural cooled down to 25°C to obtain liquid crystal physical gels. After 0.5 h, the glass bottle with liquid crystal physical gels was put into an oil-bath whose temperature was 38°C which higher than the clear point of 5CB. When the glass bottle was tipped, no fluid was observed in the glass bottle, we deemed it “successful gelation”. The minimum gelation concentration of gelator needed for gelation is called MGC. Continue heating at a rate of 2.0 °C/min, when gel turns into sol, the temperature is called T_{GS} . The decomposition temperature (defined as temperature that weight percentage loss 5 wt%) were estimated by a TGA Q50 at a scanning rate of 10 °C/min under N₂ atmosphere. The phase structure and phase transition temperature of liquid crystal physical gels were comprehensively characterized by DSC and POM. The DSC curves were measured by TA Q10 with heating and cooling rate of 10 °C/min. The liquid crystal textures were captured by polarizing microscope instrument (POM) during the cooling process with cooling rate of 2 °C/min. The Carry-100 spectrophotometer was employed to measure UV-vis absorption spectra, and the fluorescence emission spectra were detected by a PTI Qm-40 luminescence spectrometer. The transmission spectrum was measured by SolidSpec-3700 instrument. The circular dichroism (CD) spectra were recorded on a JASCO J-810 instrument, and a JASCO CPL-300 instrument was used to record CPL emission spectra. The prepared liquid crystal physical gels was injected into an indium-tin oxide (ITO)-coated LC cell with 15 μm thickness, and the GRATTEN APS15-3A power supply was used to provide applied direct current (DC) electric field, and the JASCO CPL-300 instrument was used to record the CPL emission spectra. The micromorphology of samples was

measured by JEOL JSM-6610 scanning electron microscope. The samples were prepared as follows: the prepared CPL liquid crystal physical gels were immersed in petroleum ether for 10 hours to remove 5CB, and then the sample was dried to obtain xerogel, which was observed by scanning electron microscope after spray gold treatment.



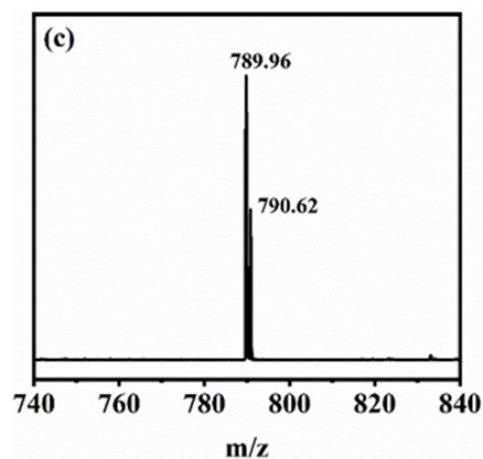


Fig. S1 ^1H NMR spectrum (a), ^{13}C NMR spectrum (b) and mass spectrum (c) of MDI- C_{18} in CF_3COOD .

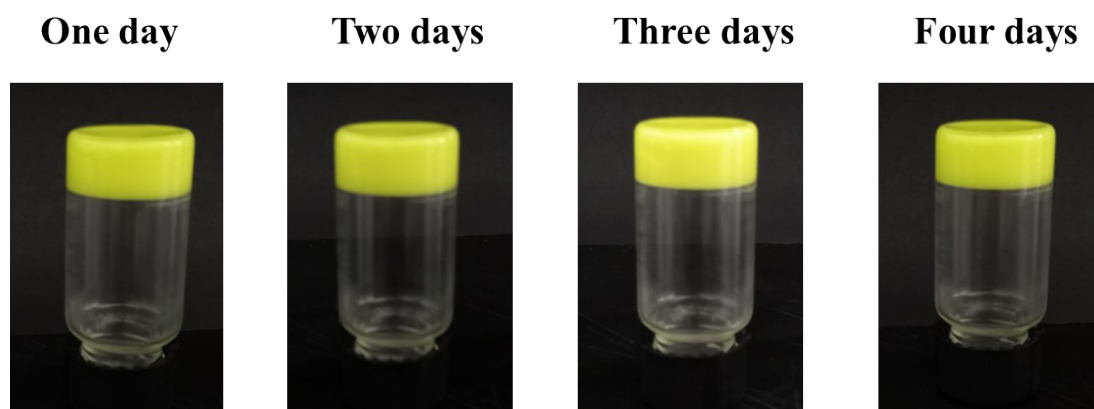


Fig. S2 Photos of liquid crystal physical gel with 6 wt% MDI- C_{18} taken at different inversion time.

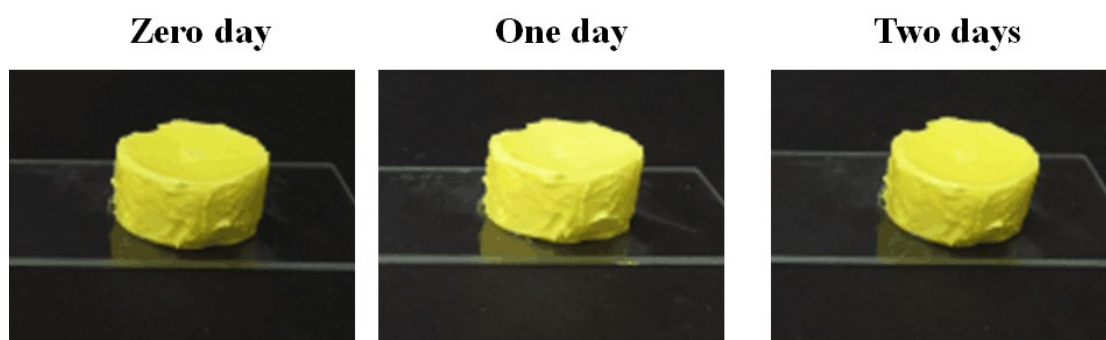


Fig. S3 Photos of liquid crystal physical gel with 6 wt% MDI- C_{18} outside the vial.

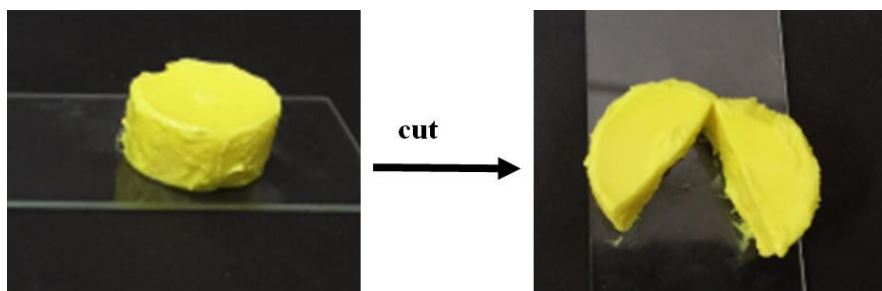


Fig. S4 Photos of liquid crystal physical gel with 6 wt% MDI-C₁₈ taken before and after cutting.