

Supporting Information

Circularly Polarized Laser with Chiral Nematic Cellulose Nanocrystal Cavity

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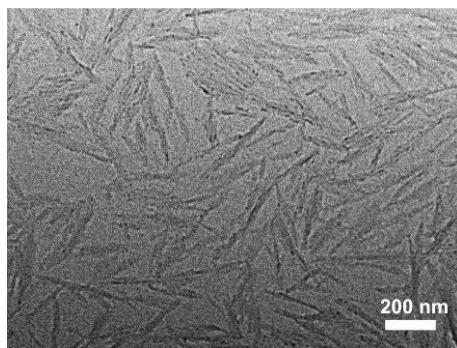


Figure S1. TEM image of CNC nanorods prepared from drying a dilute CNC suspension on the grid.

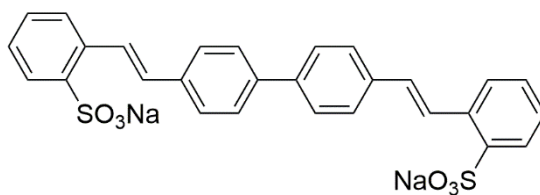


Figure S2. Molecular structure of SB.

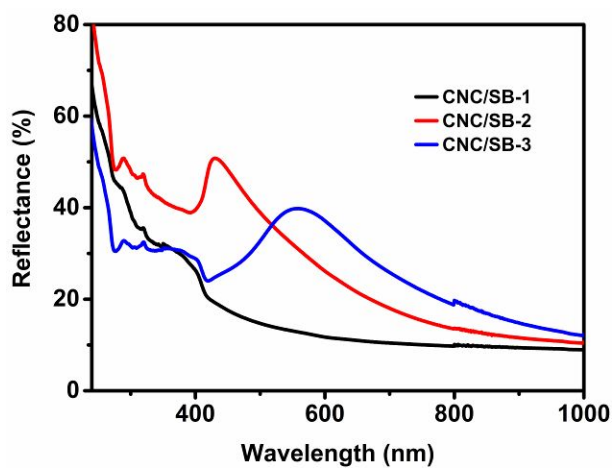


Figure S3. Reflectance spectra of CNC/SB films.

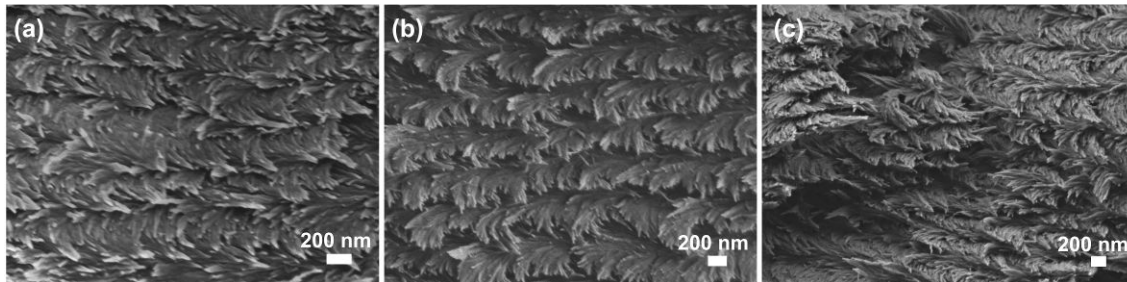


Figure S4. SEM images of (a) CNC/SB-1, (b) CNC/SB-2 and (c) CNC/SB-3 films, showing typical left-handed chiral nematic structure. The images are taken in oblique cross-section.

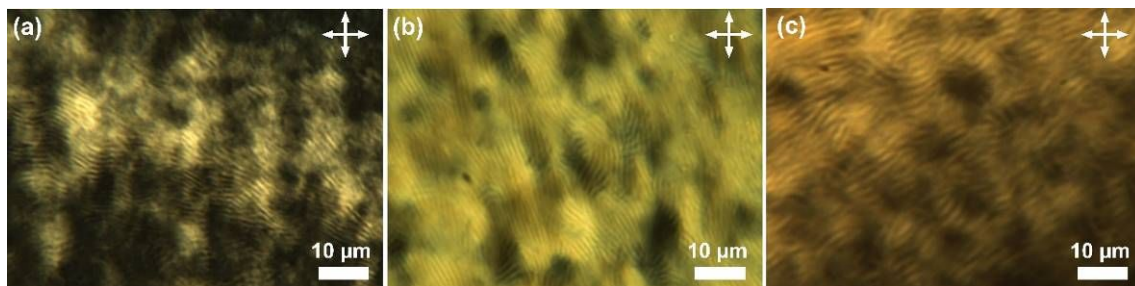


Figure S5. POM images of (a) CNC/SB-1, (b) CNC/SB-2 and (c) CNC/SB-3 suspensions during evaporation, showing fingerprint textures, indicating the formation of chiral nematic structures (the crossed arrows indicate the analyzer and polarizer and the images are taken in transmission mode).

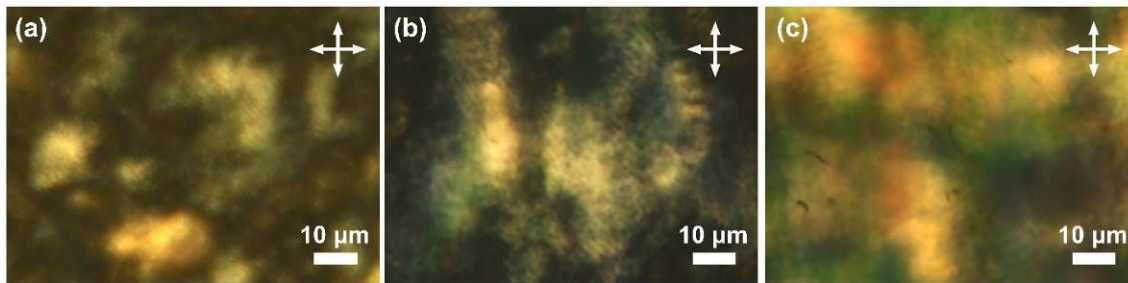


Figure S6. High-resolution POM images of (a) CNC/SB-1, (b) CNC/SB-2 and (c) CNC/SB-3 film, showing birefringence and fingerprint textures, the crossed arrows indicate the crossed analyzer and polarizer (the images are taken in transmission mode).

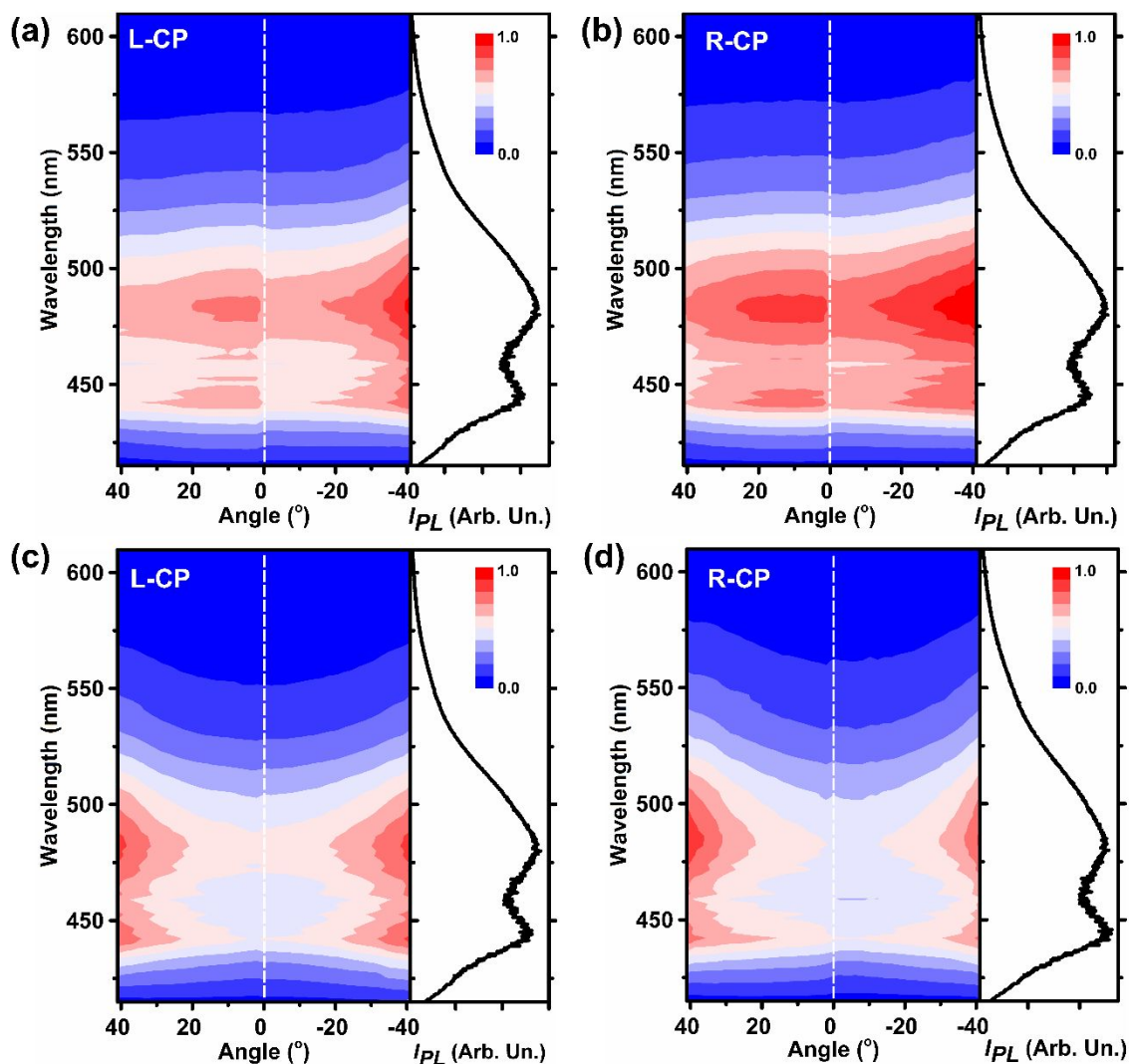


Figure S7. Angular-resolved, circularly polarized PL spectra of (a,b) CNC/SB-1 and (c,d) CNC/SB-2 film. The films are excited with a L-CP laser. Maps show the PL spectra with L-CP polarization [(a) and (c)], or with R-CP polarization [(b) and (d)]. The spectra collected at 0° (collection direction perpendicular to the sample surface, which is highlighted by the dashed lines in the maps) are shown on the right of each map.

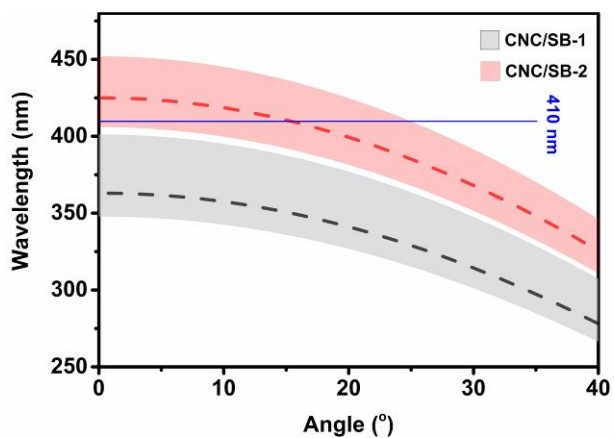


Figure S8. Angular-dependent PBG of CNC/SB-1 and CNC/SB-2 films. The dashed line indicates the calculated reflection peak. The blue solid line is the excitation light at 410 nm.

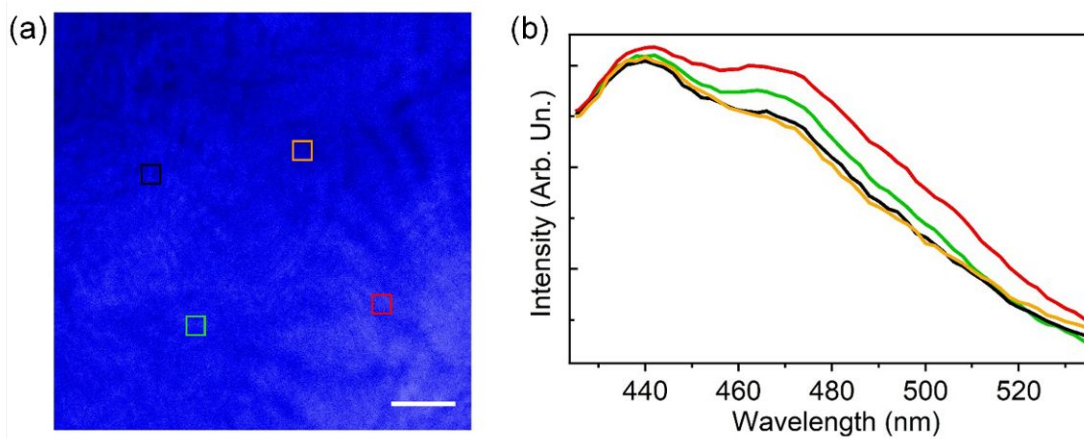


Figure S9. (a) Fluorescence confocal micrograph of a CNC/SB-2 film. Scale bar: 10 μm .
(b) Spatially-resolved emission spectra collected in the areas marked by black, red, green and orange boxes in (a).

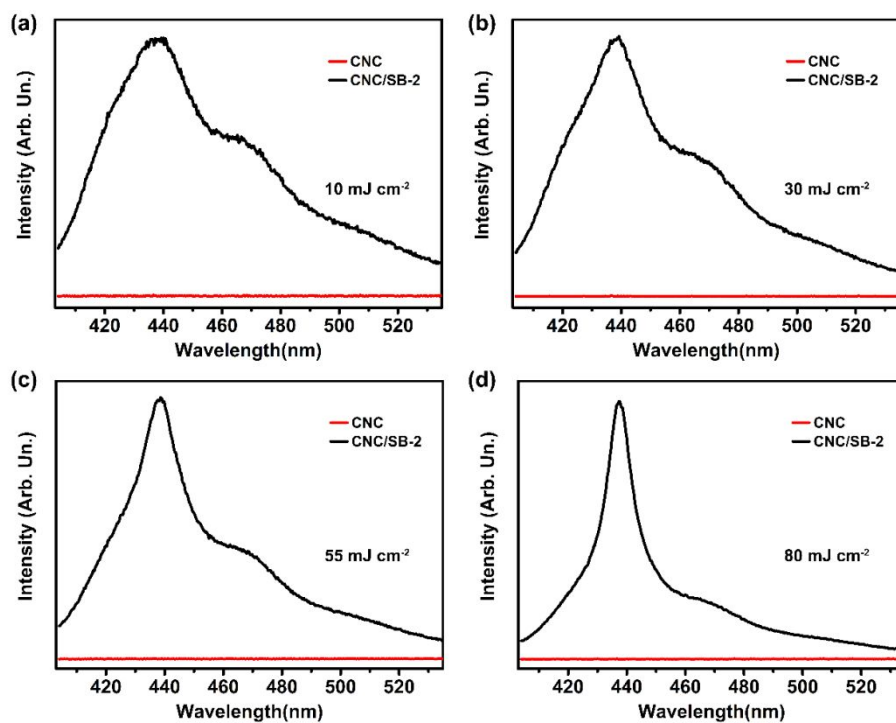


Figure S10. Comparison of the emission spectra of pristine CNC (red curves) and CNC/SB-2 (black curves) films. The excitation fluence is: (a) 10 mJ cm^{-2} , (b) 30 mJ cm^{-2} , (c) 55 mJ cm^{-2} and (d) 80 mJ cm^{-2} .

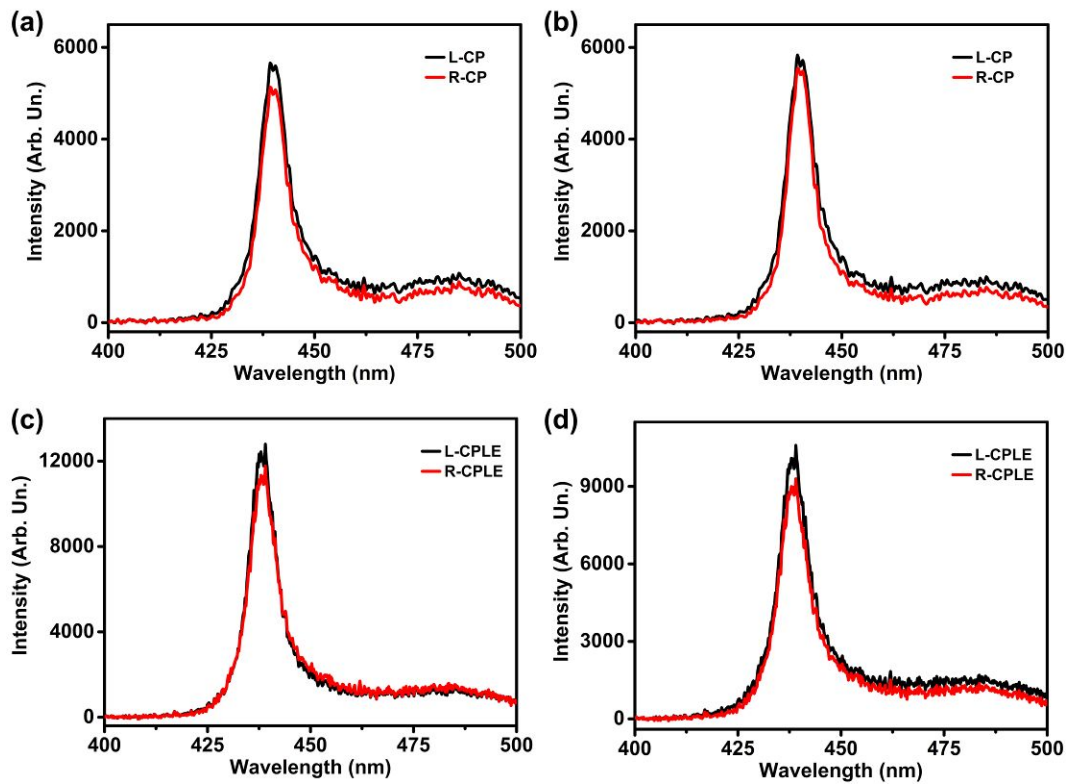


Figure S11. L-CP and R-CP emission spectra of CNC/SB-1 upon excitation with (a) L-CP and (b) R-CP laser. L-CPLE and R-CPLE spectra of CNC/SB-3 upon excitation with (c) L-CP and (d) R-CP laser. The excitation fluence is 90 mJ cm^{-2}