Supporting information

Chiral Nematic Porous Germania and Germanium/Carbon Films

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\textbf{Figure S1.} TEM images of the aqueous solution of CNCs (0.002 wt%).
**Figure S2.** CD spectra of a GeO$_2$/CNC composite film obtained by rotating the sample from 0° to 90°. No significant change is observed, indicating that the positive signal is not dominated by linear birefringence.

**Figure S3.** SEM images viewed perpendicular to fracture cross-sections of the GeO$_2$/CNC composite films prepared using the water/DMF ratio of 1:1 (a) and 1:2 (b).
**Figure S4.** FTIR spectra of chiral nematic GeO$_2$/CNC composite film GeO$_2$/CNC (a) and the corresponding chiral nematic GeO$_2$ films Ge-A (b), mesoporous Ge/C composite film Ge-H (c) and GeO$_2$/C composite film Ge-N (d).

**Figure S5.** TGA curve of (a) the chiral nematic GeO$_2$/CNC composite film and the corresponding chiral nematic mesoporous (b) Ge/C composite film Ge-H and (c) GeO$_2$/C composite film Ge-N.
Figure S6. Expanded SEM images of chiral nematic GeO$_2$ films (Ge-A) obtained by calcination of GeO$_2$/CNC composite films under flowing air. (a,b) The top view with low magnification confirms the smooth surface of GeO$_2$ film; (c,d) Under higher magnification, the images viewed along the edges showing the layered twisting structures.
**Figure S7.** N$_2$ absorption and desorption isotherms of chiral nematic GeO$_2$ films (Ge-A) obtained from calcination of the GeO$_2$/CNC composite film under air. This material has very low surface area.

**Figure S8.** Raman spectra of chiral nematic mesoporous Ge/C film (Ge-H, blue line) and GeO$_2$/C composite film (Ge-N, red line).
Figure S9. Expanded TEM images of GeO\textsubscript{2}/C films (Ge-N).