Supporting Information

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3D Hollow Xerogels with Ordered Cellulose Nanocrystals for Tailored Mechanical Properties

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Supporting Information

Three-dimensional Hollow Xerogels with Ordered Cellulose Nanocrystals for Tailored Mechanical Properties

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Figure S1. TEM image of prepared CNCs and the size distribution of samples (N=50).

Figure S2. Schematic illustration of hydrogen bonding between CNCs and polyacrylamide (PAM) in the hydrogel.
Figure S3. Oscillation shear frequency sweep of the dynamic hydrogel containing 2 wt% CNCs with constant strain amplitude as 1%.

Figure S4. Birefringence of PC2/2 between the crossed polarizers.
Figure S5. The orientation index of three positions of PC xerogels with different stretching ratios.

Figure S6. Compression force-deformation curves of the PC xerogels.
Figure S7. The compression force-deformation curves of cylinder xerogels.

Figure S8. The compression force-deformation curves of PC xerogels.
Figure S9. Fracture energy ($G_f$) of PC and cylinder xerogels.

Figure S10. The second compression force-deformation cycles of PC and cylinder xerogels at almost the same strain (5%).
Table S1. The geometric parameters of samples (N≥3).

| Elongation ratio | T/mm    | D1/mm  | D2/mm  |
|------------------|---------|--------|--------|
| 1                | 0.63±0.02 | 6.25±0.27 | 8.50±0.12 |
| 2                | 0.49±0.08  | 4.09±0.32  | 8.59±0.07  |
| 5                | 0.24±0.01  | 2.70±0.11  | 8.52±0.01  |
| 10               | 0.16±0.03  | 1.79±0.04  | 8.71±0.09  |