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Supplementary Materials for

Photonic paper: Multiscale assembly of reflective cellulose sheets in *Lunaria annua*

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This PDF file includes:

Figs. S1 to S7

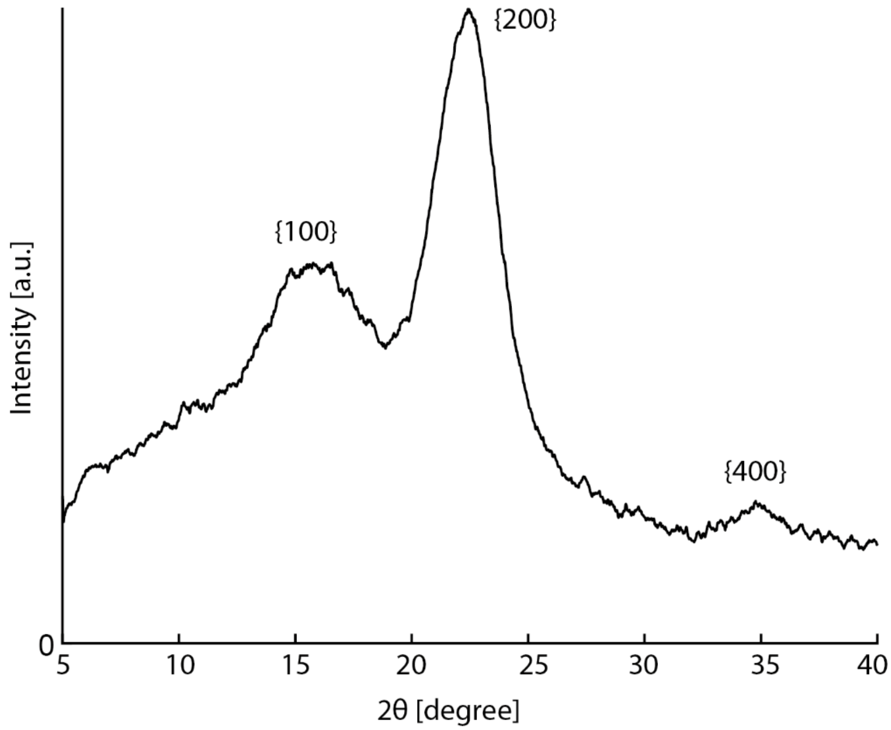

Fig. S1. X-ray diffraction plot of a *Lunaria annua* septum. The crystalline structure of the cellulose in the septum is cellulose I. This is confirmed by the peak positions of the crystalline family planes {100}, {200}, and {400} which are, respectively, at 2Θ~14-17º, ~22º, and 34º.

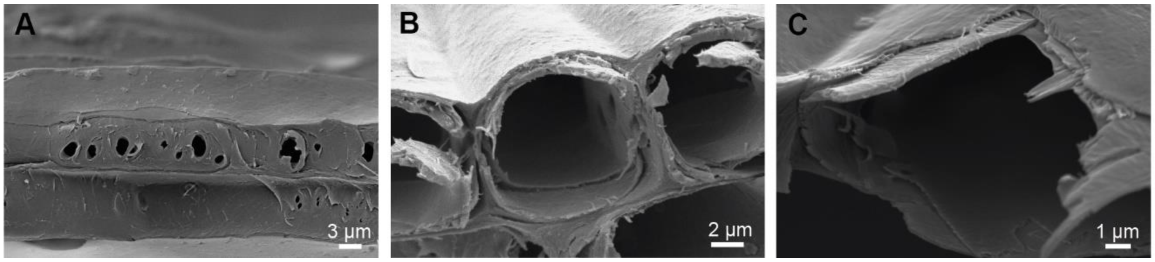

Fig. S2. Thin-film assembly in the *Lunaria* septum cells. The cellulose thin-film assembly in the cell wall can be seen in the delaminating bilayer construct (**A**) and in the cross-section of the cells (**B**) and (**C**). The cell wall pores can also be seen along the length of the cell in (**A**).

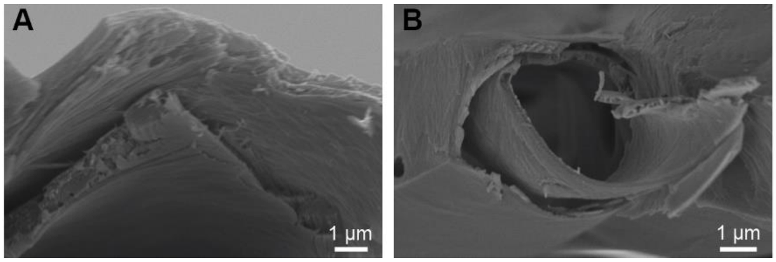

Fig. S3. Orientation of the cellulose fibers in the *Lunaria* cells' cladding. The cellulose fibers are seen aligning along the circumference of the thin film cladding constituting the cell wall.

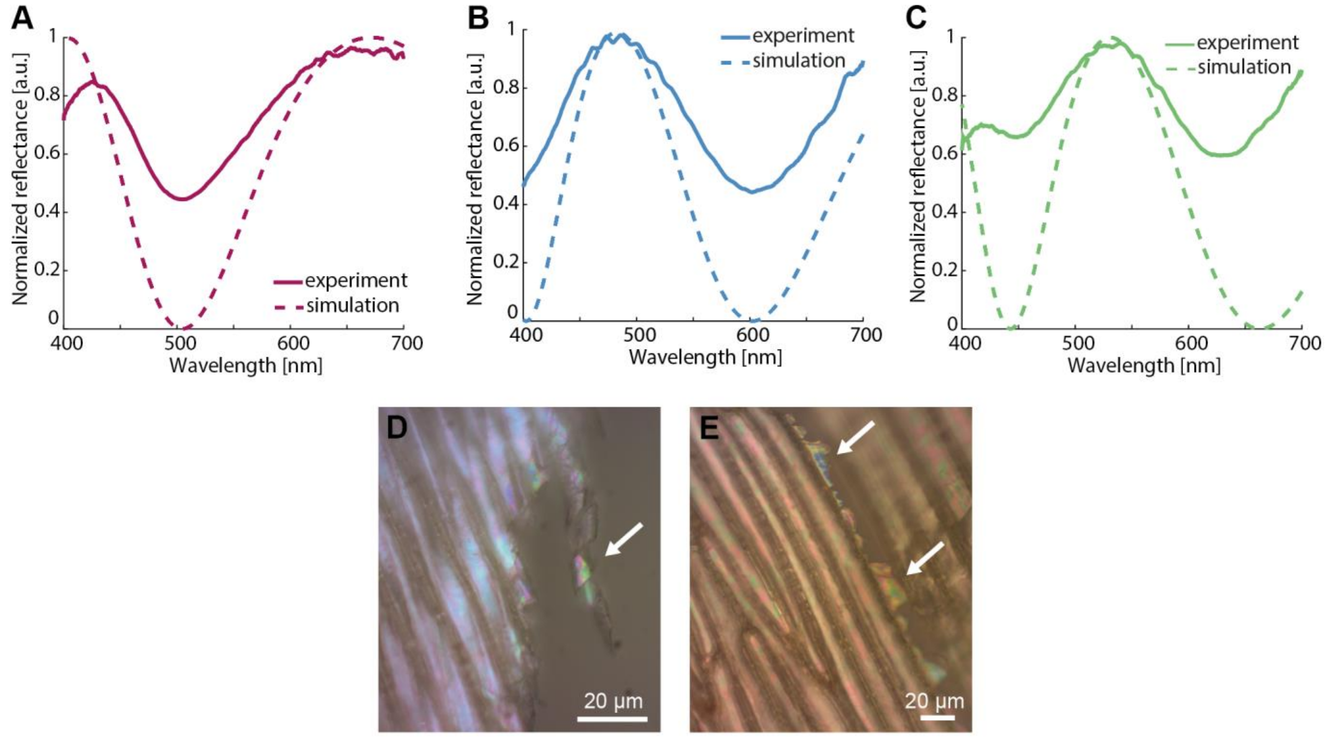

Fig. S4 Thin-film interference coloration in *Lunaria annua* septa. At the microscopic level the reflectance from individually colored regions consists in fringes caused by thin-film interference (solid lines). This behavior is confirmed by the reflectance spectrum (dashed lines) originated by simulating a 1D-thin film of cellulose surrounded by air which corresponds to the upper cladding of a single cell in the *Lunaria* septum. The experimental spectra reported in (**A**), (**B**) and (**C**) correspond, respectively, to the magenta, blue and green single-colored regions of Figure 2B. The simulated spectra reported in (**A**), (**B**) and (**C**) have been calculated using a cellulose thickness of, respectively, 318 nm, 380 nm, and 418 nm. (**D**) and (**E**) show macroscopic brightfield reflectance images of *Lunaria annua* septa where thin-film interference colors can be observed in delaminating regions of the cells (**D**, white arrow) and in broken parts of the cladding (**E**, white arrows).

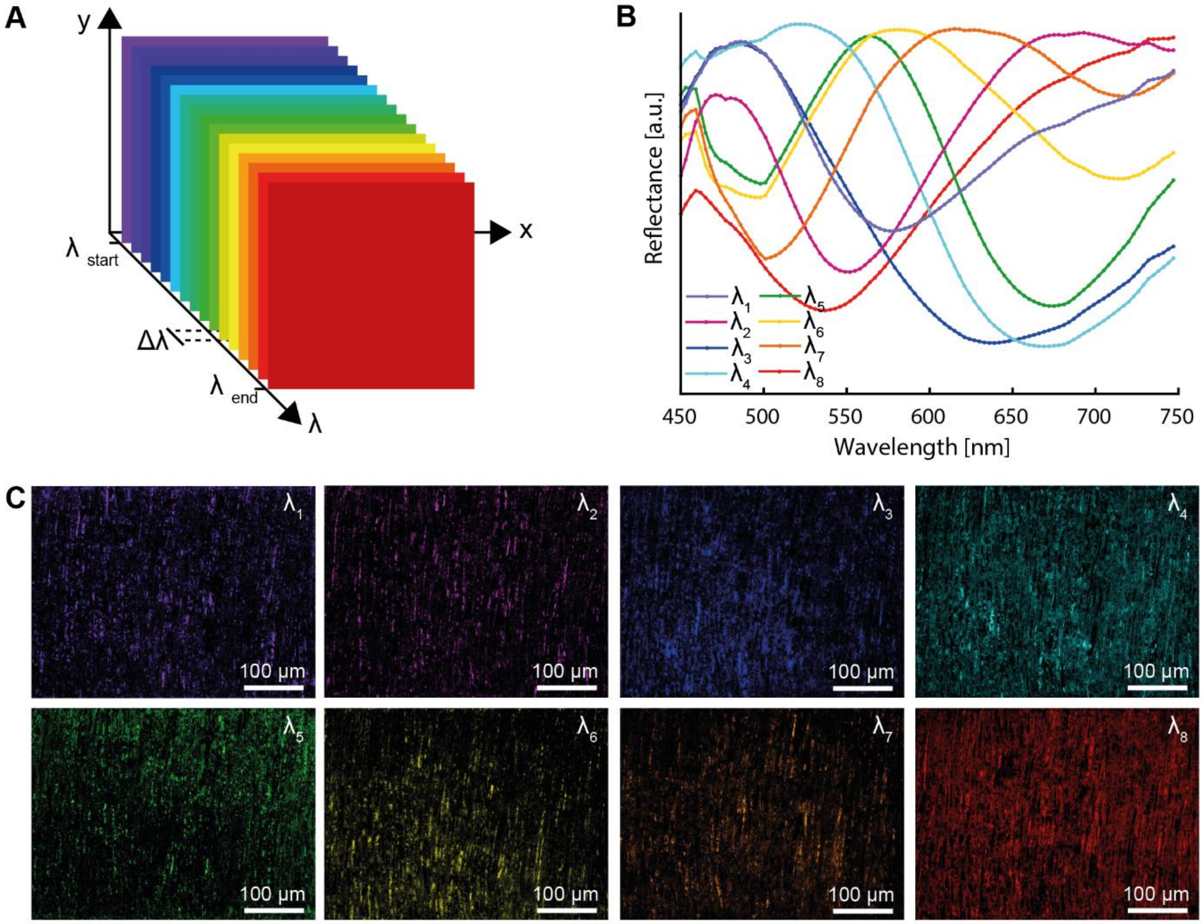

Fig. S5 Multispectral mapping of *Lunaria annua* septum. (**A**) Schematic representing the three-dimensional maps that can be obtained with a multispectral camera. The spectroscopic information of the sample, defined by the spatial coordinates x and y, is collected for each pixel at every wavelength defined by the range λ_{start}-λ_{end} and by the step size $\Delta\lambda$. The stack of these images creates the three-dimensional map. (**B**) Reflectance spectra for 8 selected spectral bands corresponding to the main reflected colors from the *Lunaria* septum acquired in the spectral range 450-750 nm with a step size $\Delta\lambda = 3$ nm. (**C**) Corresponding false-color optical micrographs for each of the 8 selected spectral regions, showing the spatial localization of each reflected color.

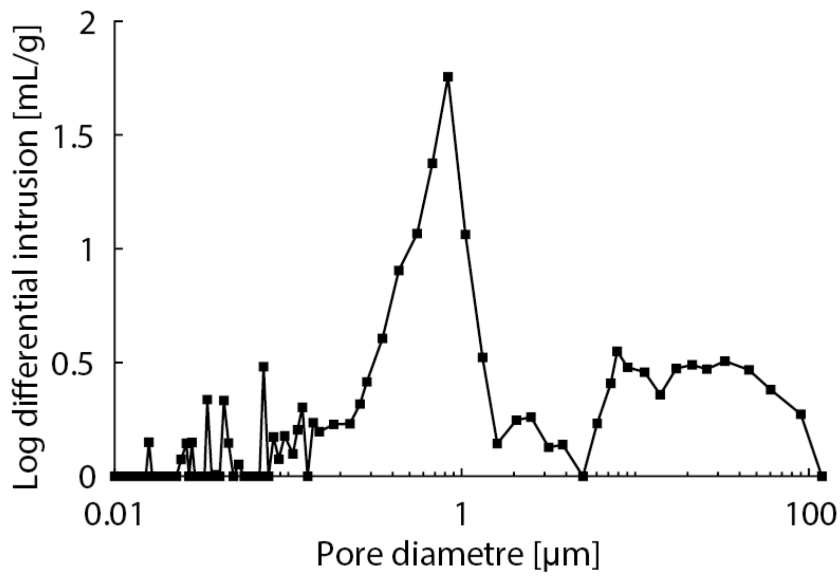

Fig. S6. Size distribution of the pores size in *Lunaria annua* septa. Pores diameter as determined using the Washburn equation corresponding to the cumulative intrusion data of Figure 3G.

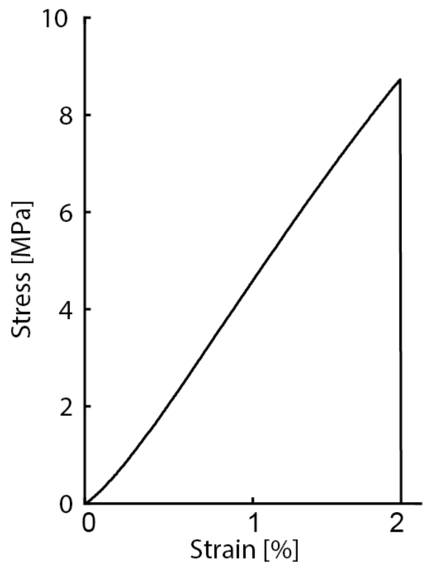

Fig. S7. Mechanical behavior of a representative *Lunaria* septum. The stress-strain curve of a representative *Lunaria* septum is indicative of a strong material with elastic behavior.