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Supplementary Materials for

Mosaics of topological defects in micropatterned liquid crystal textures

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The PDF file includes:

Other Supplementary Material for this manuscript includes the following:

(available at advances.sciencemag.org/cgi/content/full/4/11/eaau8064/DC1)

Movie S1 (.mp4 format). Fast Iso-N cooling of 8CB in pattern I with PI surface treatment.
Movie S2 (.mp4 format). Fast Iso-N cooling of 8CB in pattern I without PI surface treatment.
Movie S3 (.mp4 format). Slow Iso-N cooling of 8CB in pattern I with PI surface treatment with a temperature gradient, example I.
Movie S4 (.mp4 format). Slow Iso-N cooling of 8CB in pattern I with PI surface treatment with a temperature gradient, example II.
Movie S5 (.mp4 format). Slow irregular Iso-N cooling of 8CB in pattern II with PI surface treatment with horizontal and vertical temperature gradients.
Movie S6 (.mp4 format). Slow N-SmA cooling of 8CB in pattern I with PI surface treatment.

Supplementary Figures

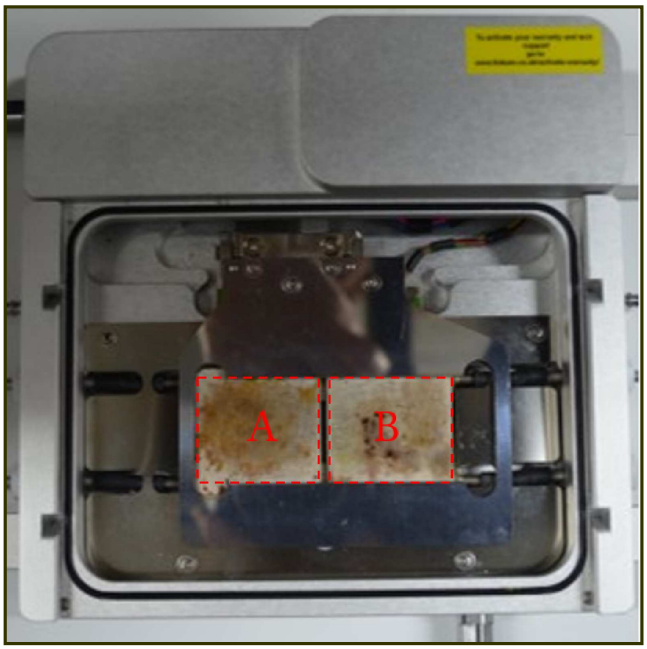

Fig. S1. Photography of temperature gradient–heating stage. Temperature of panel A and panel B can be independently controlled. For applying temperature gradient to the LC cell, initially both panels were set above Iso temperature ($\approx 41\ ^{\circ}\mathrm{C}$) and then cooled down to N or SmA phase at different rates, e.g. $10\ \mathrm{K/min}$ and $0.1\ \mathrm{K/min}$ for A and B, respectively.

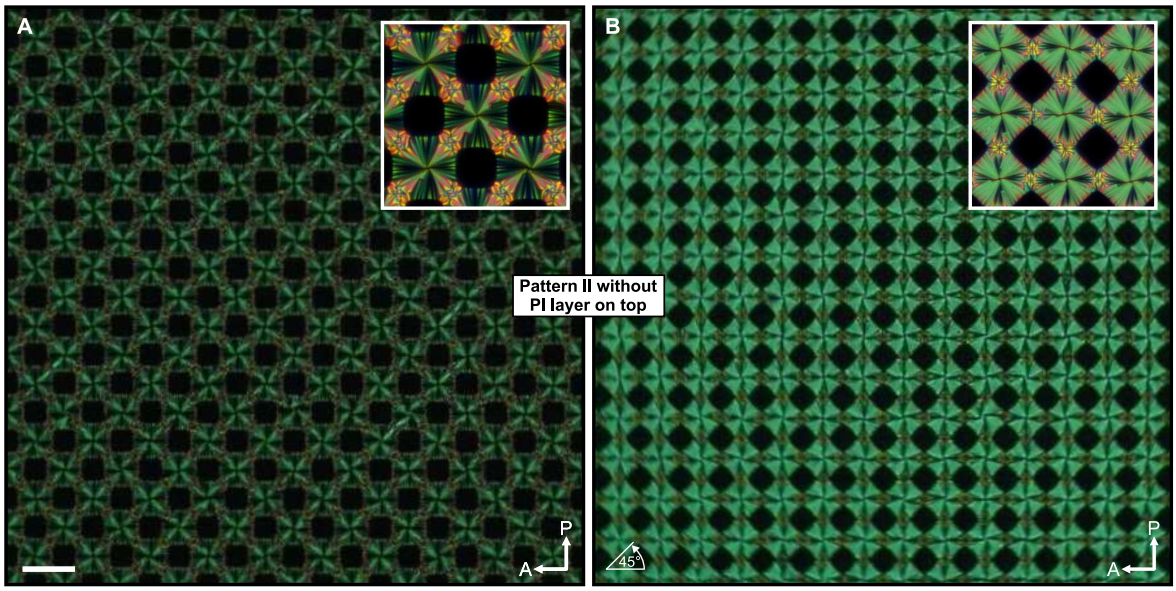

Fig. S2. Large-area uniformity of micropatterned SmA texture. (**A**) and (**B**) show two orientations of the same SmA texture with respect to the polarizers, extending over hundreds of micrometers. With fast cooling, uniform textures with no dislocated defects can be produced. Insets show enlarged sections of the lattice with many intriguing details. Scale bar, $30\ \mu\mathrm{m}$.

Supplementary Movie Captions

All videos were recorded between crossed polarizers with an inserted λ waveplate at 30 fps. The view field size is $180\ \mu\text{m} \times 180\ \mu\text{m}$.

Movie S1. Fast Iso-N cooling of 8CB in pattern I with PI surface treatment. A regular lattice of uniform -1 defects with pinwheel-like texture is produced.

Movie S2. Fast Iso-N cooling of 8CB in pattern I without PI surface treatment. A denser lattice of defects is created, with $+1$ defects in the large spaces between four pillars and -1 defects between pairs of pillars.

Movie S3. Slow Iso-N cooling of 8CB in pattern I with PI surface treatment with a temperature gradient, example I. Horizontal temperature gradient causes temporary higher order defects that get dragged and disintegrated in a lattice with dislocations.

Movie S4. Slow Iso-N cooling of 8CB in pattern I with PI surface treatment with a temperature gradient, example II. A temperature gradient that is not parallel to the patterned substrate causes topologically disordered state with various defect arrangements. A difference in birefringent colors can be attributed to different thickness of the LC sample.

Movie S5. Slow irregular Iso-N cooling of 8CB in pattern II with PI surface treatment with horizontal and vertical temperature gradients. Cooling nucleates from the bottom of the LC cell, creating two fronts: one when only the bottom of the cell orients, and another when the order propagates to the top, resulting in color changes.

Movie S6. Slow N-SmA cooling of 8CB in pattern I with PI surface treatment. During transition into the smectic phase, requirement for equal-layer-spacing results in layer instabilities at a short length scale, producing stained glass-like textures.