Electronic Supplementary Information for

Ring-shaped liquid crystal structures through patterned planar photo-alignment

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Video V1: As part of the electronic supplementary information, a video was made that shows the effect of focusing and defocusing of the microscope on a sample with structure A. In this structure a ring-shaped region is formed in which the liquid crystal is aligned perpendicular to the glass substrates.

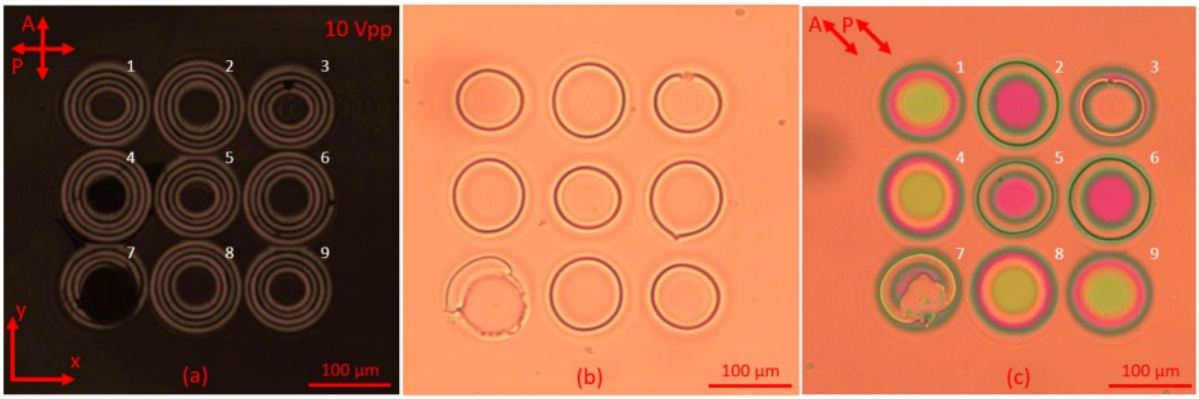

Figure S1: Microscope images of an array of ring structures when the spacing is equal to D = 2*r_{out} at 10 V_{pp} between crossed polarizers (a) and without polarizers after decreasing the voltage to 0 V (b). After several hours some rings changed to structures B and C (c).

From **figure S1**(a) the alignment near the substrate can be verified, based on the intensity, because the LC in the bulk is almost vertical and does not add any retardation because of the relatively high applied electric field (10 V_{pp}). After the voltage is decreased to 0 V it can be seen how structure A is present in all but ring 7. After several hours have passed, rings 1, 4, 8 and 9 have changed to structure C, while rings 2, 5 and 6 changed to structure B. Structure A is still found in ring 3 but the ring does have an imperfection at the top because of some fault in the alignment pattern that is visible in fig. S1(a). A bigger fault in the alignment pattern can also be seen in ring 7. Note that these transitions from A to B and C are not always observed in the same rings. It is not guaranteed that repeating this experiment would lead to the same transitions.

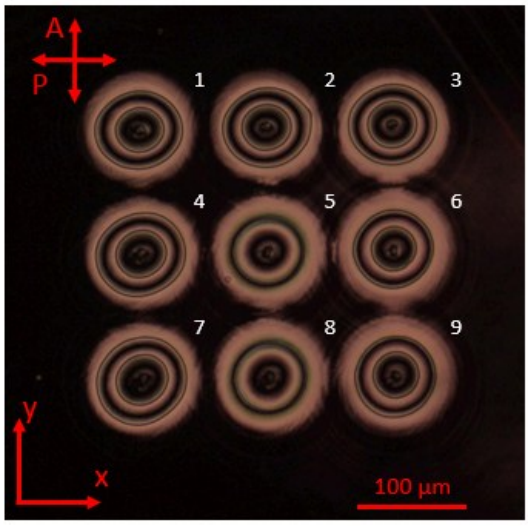

Figure S2: Microscope image of an array of ring structures when the spacing is equal to D = 2*r_{out}, observed with crossed polarizers without any applied voltage showing structures A (rings 5 and 8) and D (all other rings).

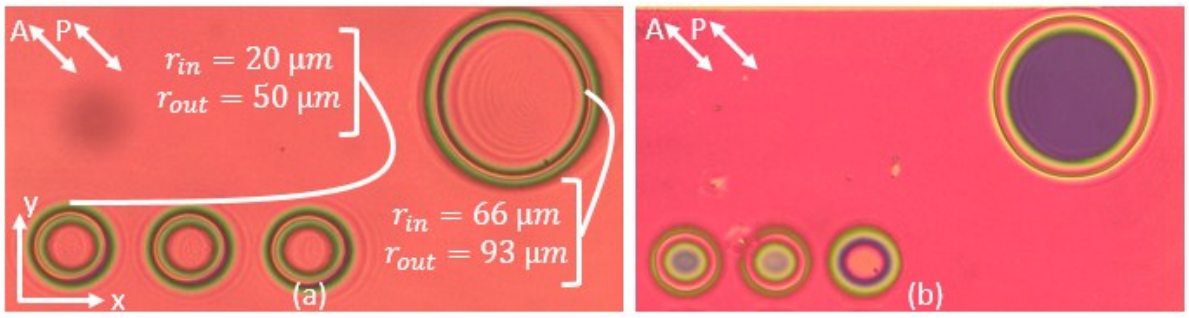

Figure S3: Microscope image of ring structures with different sizes between parallel polarizers rotated 45° with respect to the x- and y-axis. The larger ring has structure A (a) and B (b).

The microscope images in **figure S3** are from the same sample but in another region (with the same type of illumination pattern). These observations were made without reheating the sample or applying a voltage for 2 months. It can be seen that in figure S3 (a), the smaller rings and the large ring all have structure A while in figure S3 (b), the large ring and two of the smaller rings have structure B and the small ring at the right has structure C. Large rings with structures C or D were never observed.

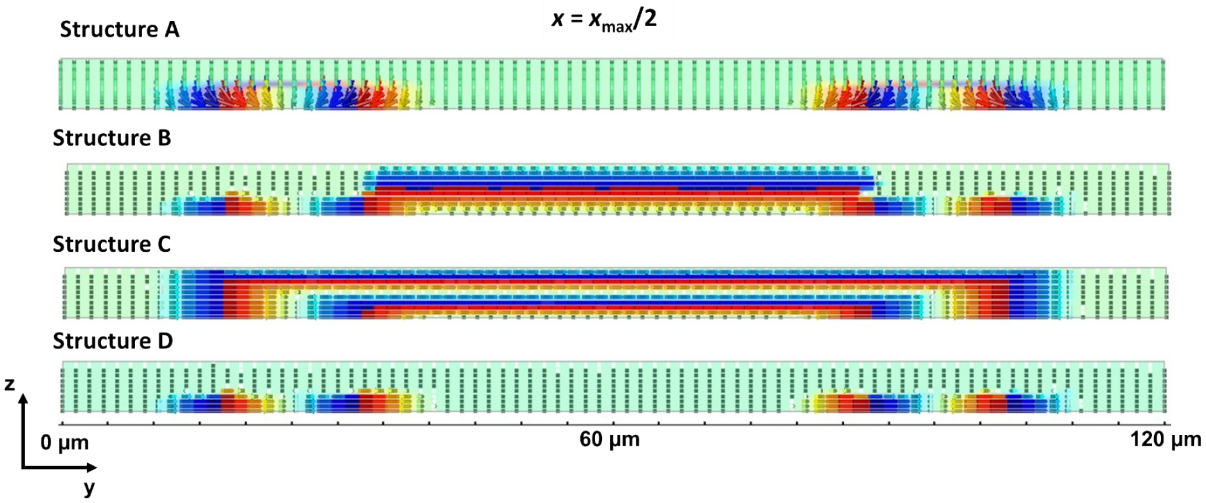

Figure S4: Initial conditions for the director configuration in the cross-section $x = x_{max}/2$ used to calculate the stable configurations in respectively structures A, B, C and D.

To define the starting conditions in the simulation, initial values for the tilt and twist angle are chosen in the 3D volume. A cross-sections of the initial condition that was used to simulate structures A, B, C and D is shown in **figure S4**. By imposing these initial conditions we were able to simulate all the experimentally observed structures. After deviating the initial conditions or after adding perturbations, no other stable structures were obtained.