Supplementary Information

Electrodynamic-Contact-Line-Lithography with Nematic Liquid Crystal for Template-Less E-writing of Mesopatterns on Soft Surfaces

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1. Wavelength vs film thickness:

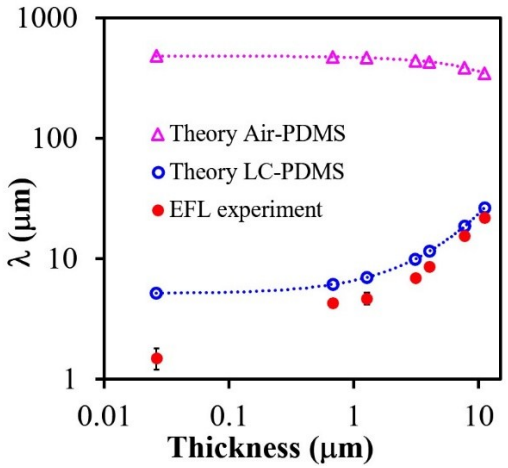

Fig S1: (Color online) Log-log plot of the characteristic wavelength (λ) of the morphology against the PDMS film thickness. The pink triangle with a pink dotted line depicts theoretical estimation of λ based on equation 1 (in main text) corresponds to the experimental geometry of fixed electrode distance of d = 35 μm and varying PDMS film thickness with air gap instead of LC upon application of bias voltage of 300V. The blue circle with blue dotted line shows theoretical estimation with LC without any air gap. This reveals that LC-PDMS system can give rise to morphology having length scale of two orders of magnitude smaller than that obtained from air-PDMS system. The red circles are the EFL experimental data for the LC-PDMS system.

2. Contrast enhanced image of Fig. 4d of the main text for better visualisation of fingers and lobes:

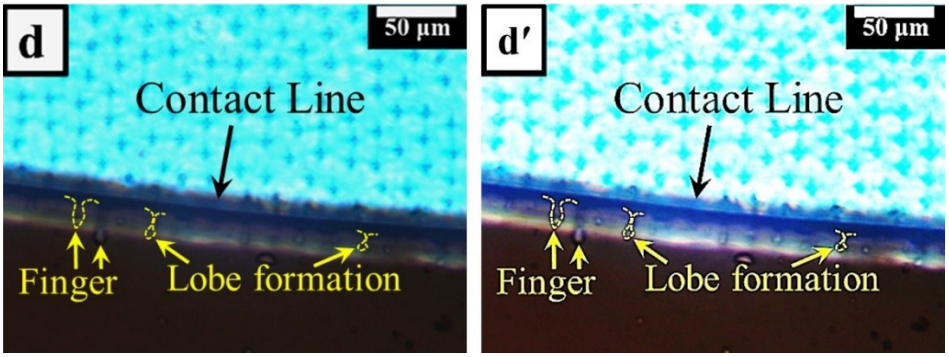

Fig. S2: Contrast of the Fig 4d of the main text is enhanced in Fig. (d′) using image processing software for better visualisation of the fingers and lobe formation.

3. Curved arrangement of microwells by ECLL:

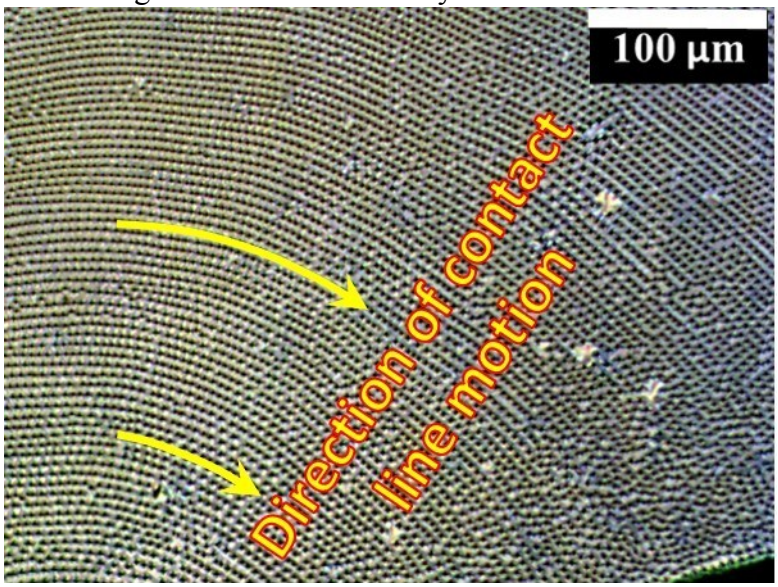

Fig S3: The curved arrangement of the microwells is achieved by driving the contact line in curved pathway. This shows the flexibility and versatility of the ECLL method for different micro/nano patterning on demand.

4. **Video 1: Pattern formation by ECLL:**

This video shows that spreading of 5CB layer on the PDMS film of thickness 0.7 µm and one dimensional array of micro wells generated as the 5CB-PDMS-Air contact line advances. This process is called Electrodynamics Contact Line lithography (ECLL) (see main text for details).

5. **Video 2: Fingering instability and electrospitting of the contact line:**
   To visualize the fingering instability, formation of lobes and electrospitting, the ECLL experiment was done on a thick PDMS film. While the 5CB layer spreads on the PDMS film, the finger formation, ejection of 5CB droplets (electrospitting) and coalescence of the droplets with the advancing contact line takes place.

6. **Video 3: Fingering instability and electrospitting of the contact line:**
   A high contrast video showing fingering instability, lobe formation and ejection of LC droplets on PDMS substrate during ECLL.