SUPPLEMENTARY INFORMATION

Liquid Crystal-on-Organic Field-Effect Transistor Sensory Devices for Perceptive Sensing of Ultralow Intensity Gas Flow Touch

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This supplementary information has following data:

(1) **Figure S1**: Detailed SEM images of OFET devices used in this work

(2) **Figure S2**: Examination of drain current change for a simple diode device without the P3HT layer

(3) **Figure S3**: Schematic illustration for the alignment of 5CB molecules on the P3HT surface upon nitrogen gas stimulation

(4) **Figure S4**: Video clip for the operation (crossed polarizer condition) of the LC-on-OFET device upon nitrogen gas stimulation

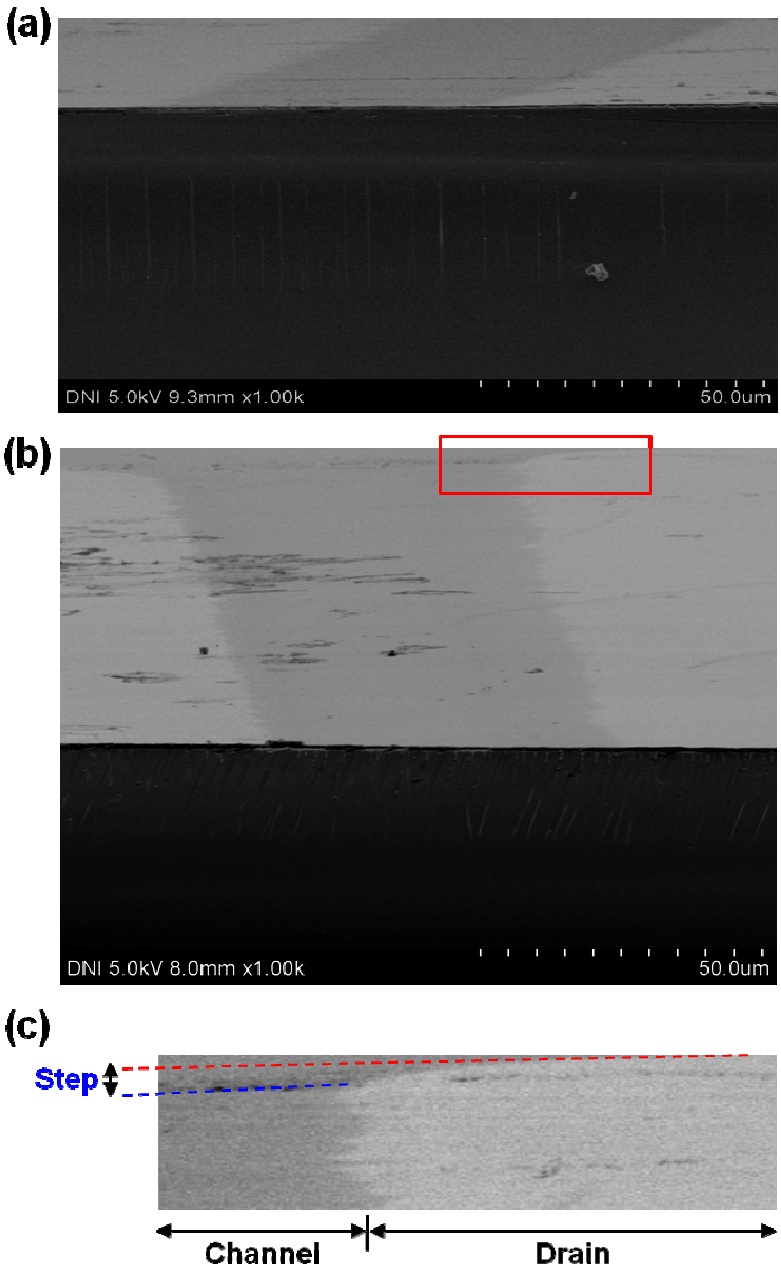

Figure S1. SEM images for the surface of the OFET device which has the P3HT layer coated over the S/D (Ag) electrode and gate insulator (PMMA) regions: (a) Full image in Fig. 1c, (b) SEM image taken from another angle to observe the step made between channel area and S/D electrode parts, (c) the enlarged image for the part marked with a red box in Fig. S2b.

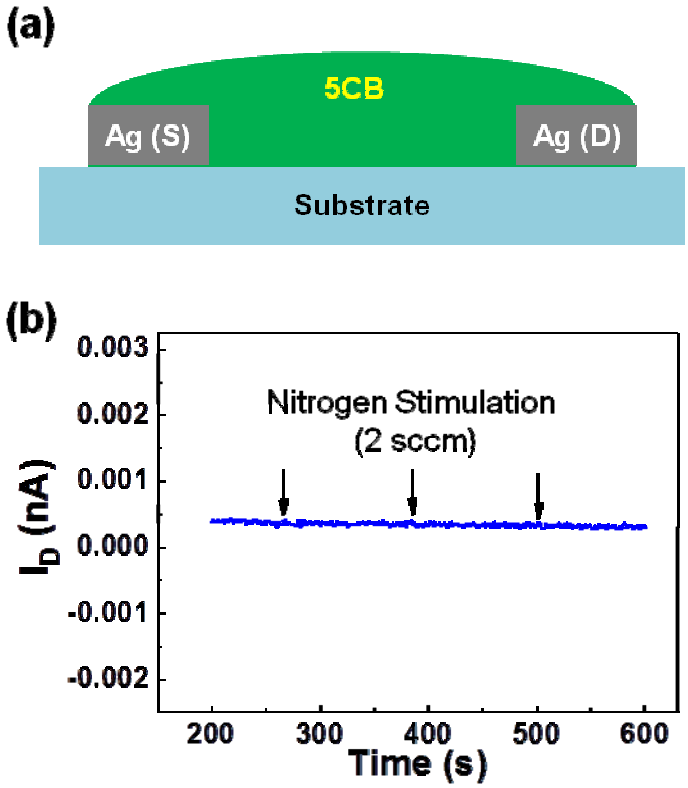

Figure S2. Examination of nitrogen gas stimulation on the surface of LC (5CB) that is directly placed on the S/D electrode and glass substrate: (a) Device structure, (b) drain current as a function of time. Arrows denote the position of nitrogen gas stimulation (2 sccm, 33 µl/s). We found (almost) no drain current change measured upon nitrogen gas stimulation, indicating that a simple nitrogen gas stimulation on LC domains without the channel (P3HT) layer could not generate any (additional) charges between the two Ag electrodes (we note that the similar result was obtained for the device without the gate insulating layer but with all other layers compared to the OFET given in Fig. 1)

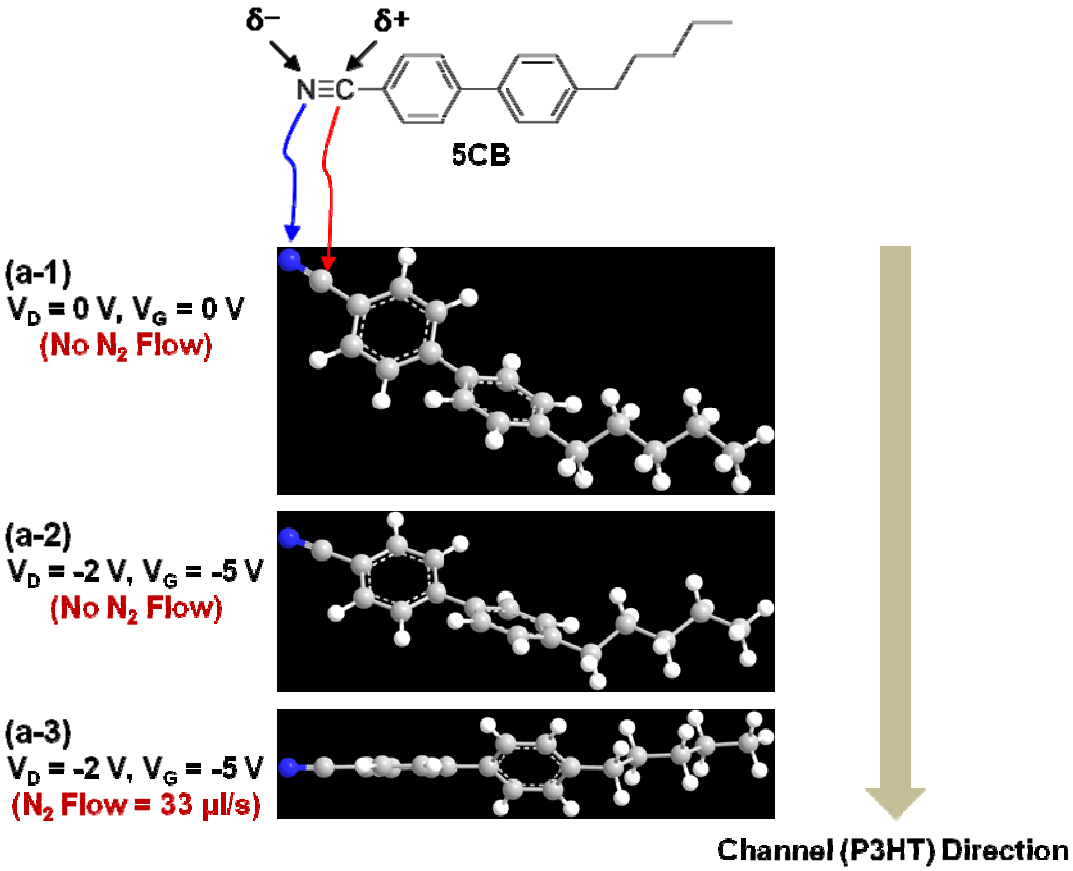

Figure S3. Schematic illustration for the expected alignment of 5CB molecules on the LC-on-OFET devices (refer to Fig. S5a): (a-1) No electric fields and no nitrogen flow touch, (a-2) applying electric fields but no nitrogen flow touch, (a-3) applying both electric fields and nitrogen flow touch. We expect that the negative dipole part in the 5CB molecules could be much closer upon nitrogen gas stimulation under biased condition (V_D = -2 V and V_G = -5 V).

Figure S4_VideoClip.avi

Figure S4. Video clip for the operation (crossed polarizer condition) of the LC-on-OFET device upon nitrogen gas stimulation (2 sccm, 33 μl/s). The video image shows that the brightness of channel part does quickly change from a dark state to a bright state by the nitrogen gas stimulation in the presence of a delayed decay after stopping the nitrogen gas stimulation. Note that the LC-on-OFET device is operated under biased condition (V_D = -2 V and V_G = -5 V). [Please see attached separate AVI file].