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***Electronic Supplementary Information for* :**

# Direct imaging of Electric field behavior in 2,7-Diphenyl[1]benzothieno[3,2-b][1]benzothiophene Organic Field-Effect transistors by Sum-Frequency Generation Imaging Microscopy

Chiho Katagiri,[a] Takayuki Miyamae,[*,b,c] Hao Li[d], Fangyuan Yang[d] and Steven Baldelli[*,d]

[a.] *Nanomaterials Research Institute, National Institute of Advanced Industrial Science and Technology (AIST), 1-1-1 Higashi, Tsukuba, Ibaraki 305-8565, Japan.*

[b.] *Graduate School of Engineering, Chiba University, 1-33 Yayoi-cho, Inage-ku, Chiba 263-8522, Japan.*

[c.] *Molecular Chirality Research Center, Chiba University, 1-33 Yayoi-cho, Inage-ku, Chiba, 263-8522, Japan.*

[d.] *Department of Chemistry, University of Houston, Houston, Texas 77204-5003, United States.*

E-mail* T. Miyamae: t-miyamae@chiba-u.jp, S. Baldelli: sbaldelli@uh.edu

## Supplementary Tables and Figures

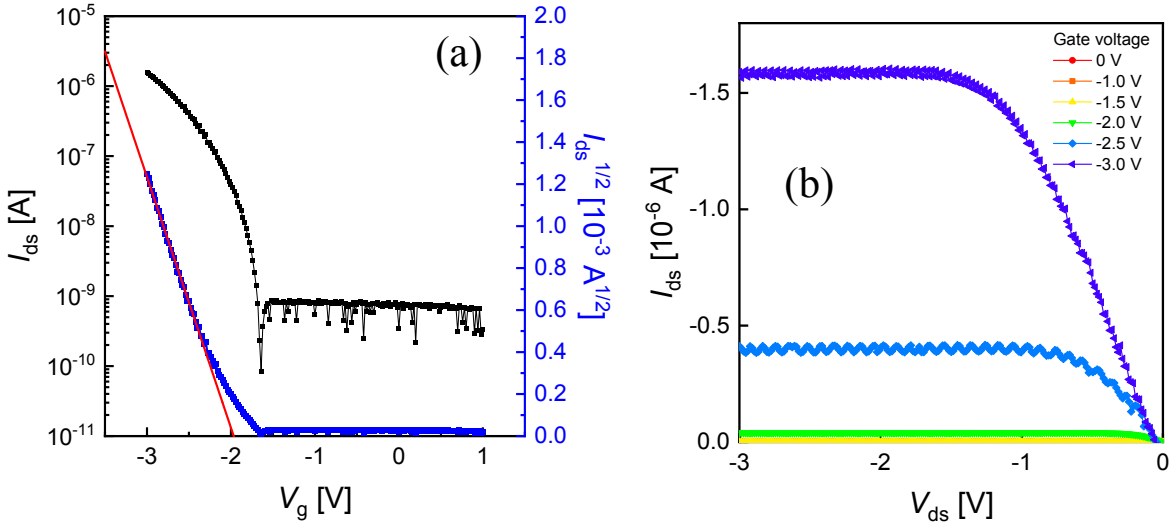


Figure S1. (a) Transfer characteristics and (b) output characteristics of the OFET device with a channel length of 50 μm. The hole mobility was estimated to be 0.22 $cm^2/Vs$.

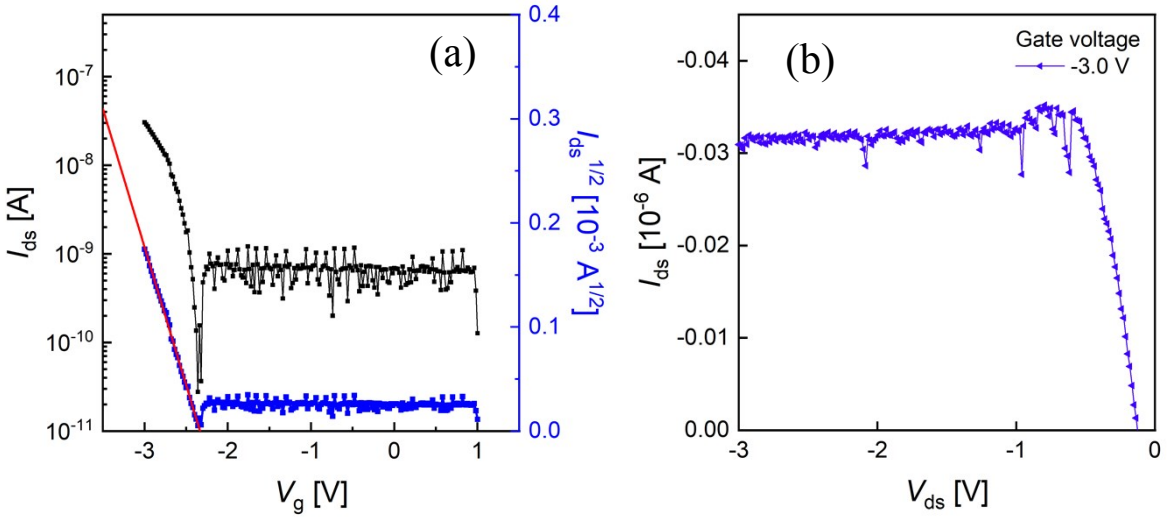


Figure S2. (a) Transfer characteristics and (b) output characteristic for a gate voltage of -3 V of the OFET device with a channel length of 300 μm. The hole mobility was estimated to be 0.065 $cm^2/Vs$.

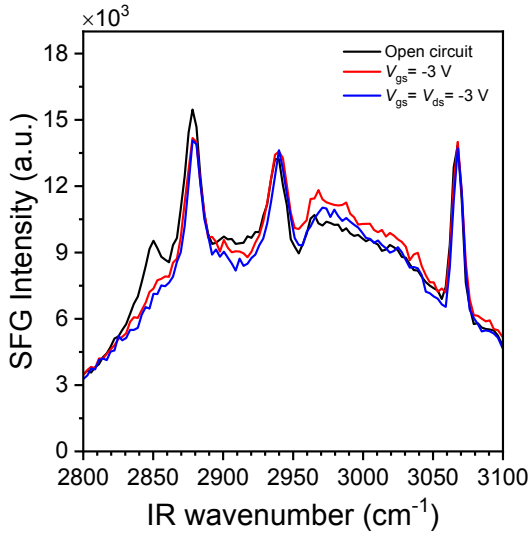


Figure S3. PPP-polarized SFG spectra of the OFET device under different voltage conditions.

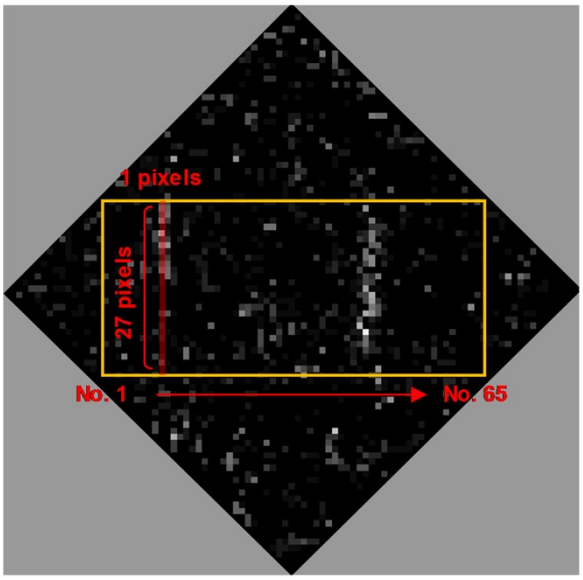


Figure S4. The reconstructed SFG image for the application of $V_{gs} = V_{ds} = -3$ V. The numbers between 1 to 65 show the position of a rectangular area with 1 × 27 pixel.

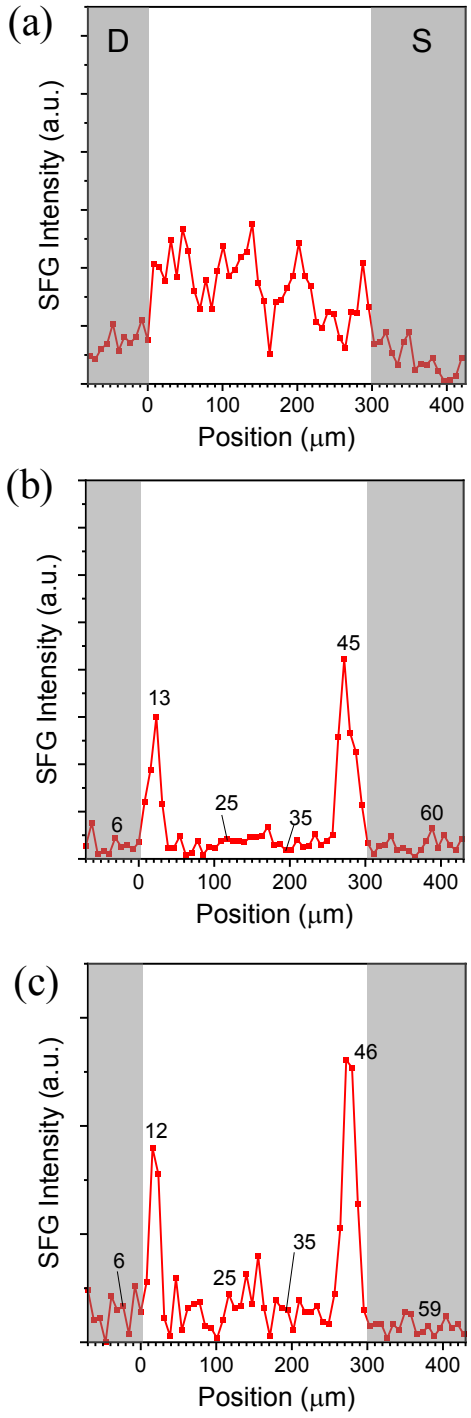


Figure S5. The intensity distribution of SFG signal of methyl CH stretching across the semiconductor channel region for (a) the open circuit condition (before turn-on voltage), (b) $V_{gs}$ = −3 V and (c) $V_{gs} = V_{ds}$ = −3 V.

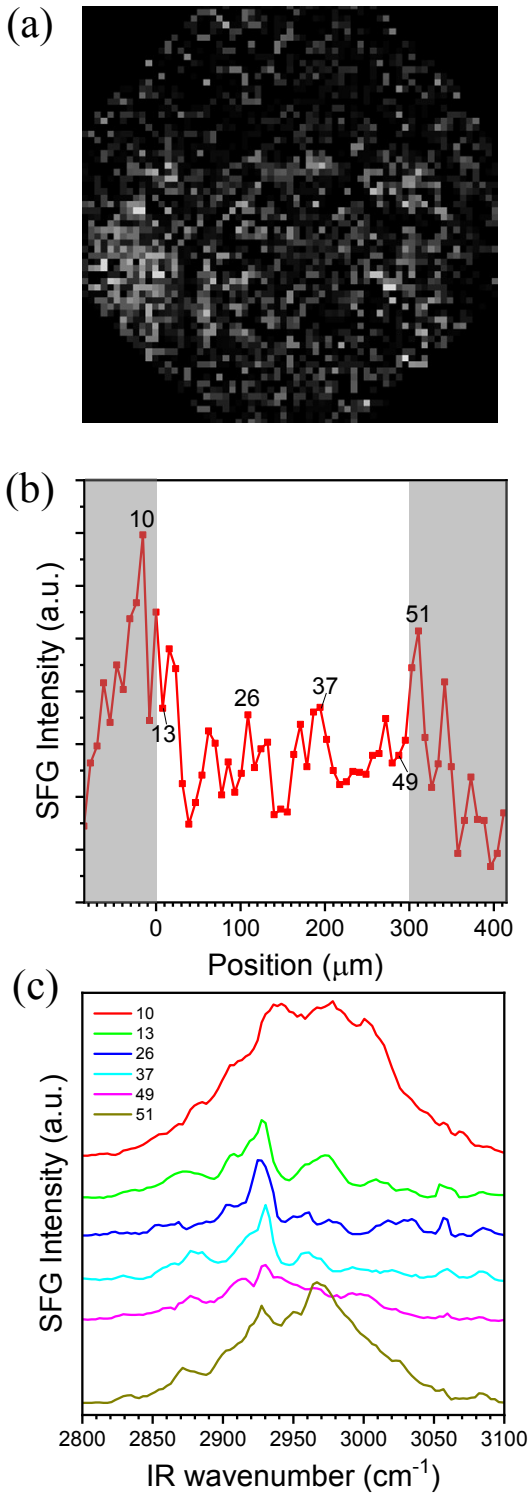


Figure S6. (a) PPP polarized SFG image at 2920 $cm^{-1}$, (b) the distribution of SFG intensity along the channel L, and (c) SFG spectra under the application of $V_{gs}$ = −3 V for No. 10, 13, 26, 37, 49, and 51 positions.

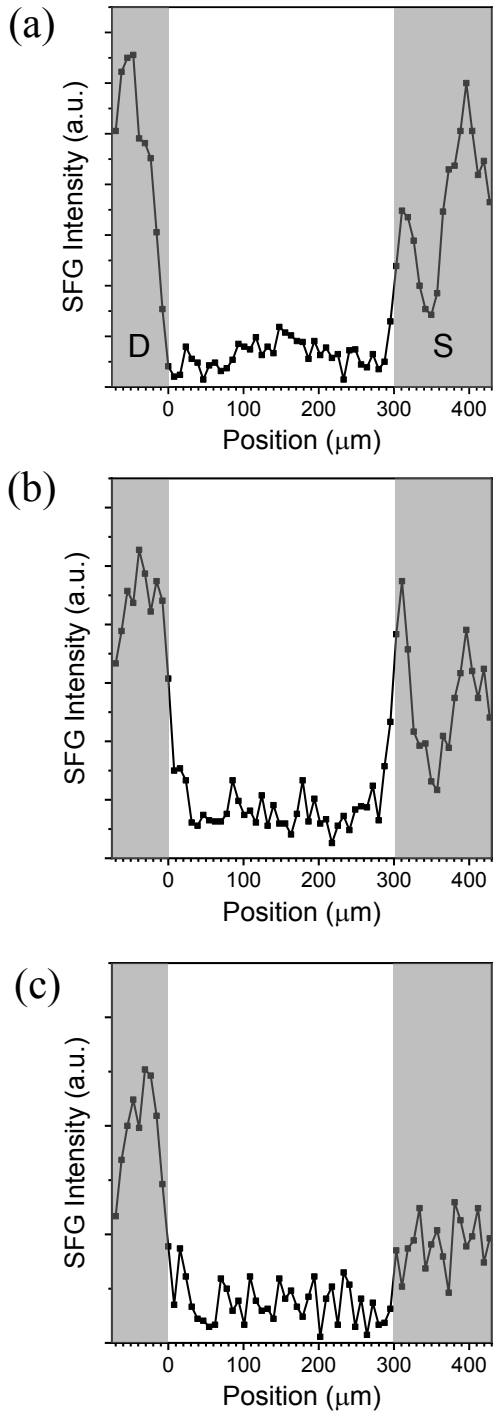


Figure S7. The intensity distribution of SSP SFG signal of phenyl CH stretching (3065 $cm^{-1}$) across the semiconductor channel region for (a) the open circuit condition (after turn-on voltage), (b) $V_{gs}$ = −3 V and (c) $V_{gs} = V_{ds}$ = −3 V. The dark spot at the center of the source electrode shown in the SFG images is the scratch of the Au electrode.