

1

Supplementary Information

2 Conductive Ionogel for the Study of Charge Transport through SAM-based Junctions in Aqueous
3 Solution

4 Xiyue Bai,^a Ningyue Chen,^a Zhou Cao,^a and Yuan Li^{a*}

5

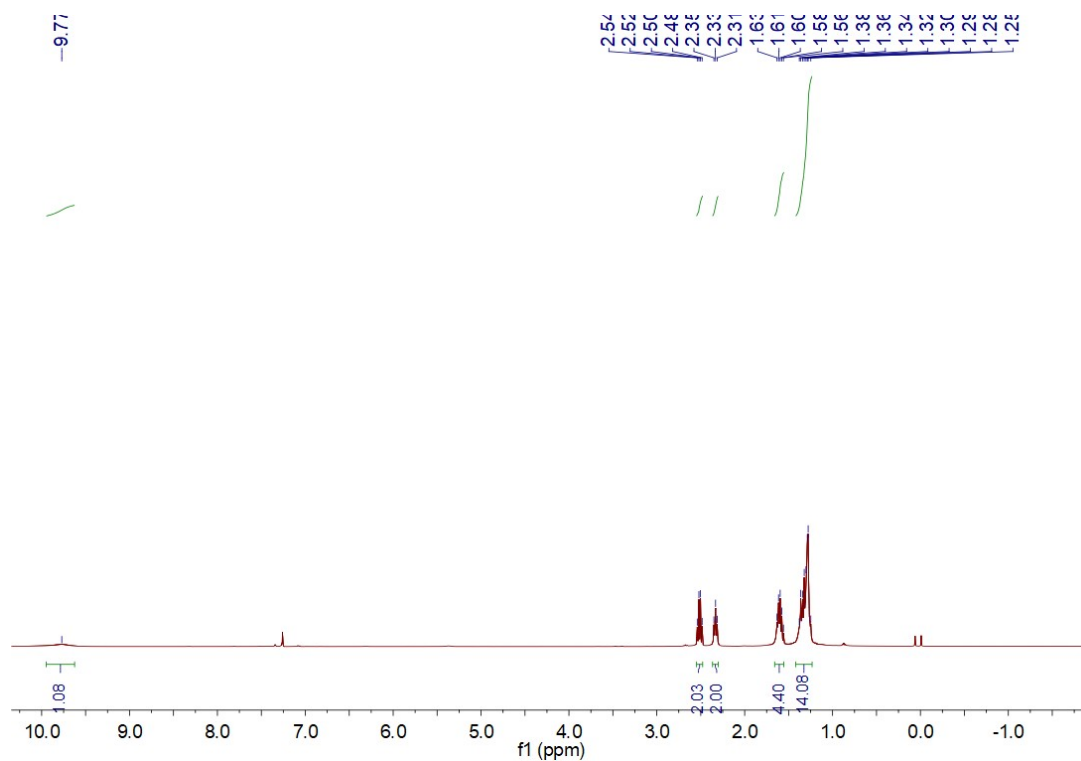
6 ^a*Key Laboratory of Organic Optoelectronics and Molecular Engineering, Department of*
7 *Chemistry, Tsinghua University, Beijing 100084, China*

8

*Correspondence: yuanli_thu@tsinghua.edu.cn

9

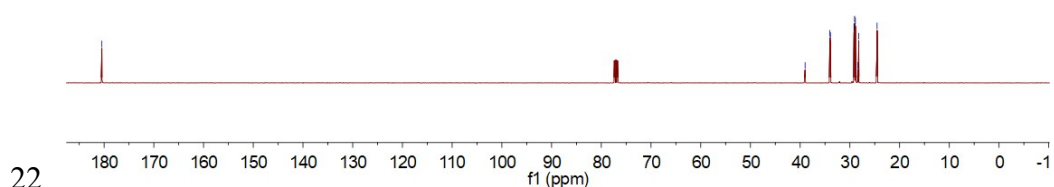
10 **Synthesis of 9-Mercaptoundecyic acid^[1]**: Thiourea (228 mg, 3.00 mmol, 1.50 eq.) and 9-
11 bromoundecanoic acid (500 mg, 2.00 mmol, 1.00 eq.) were added to 30 mL ethanol in a
12 Schlenk-tube and the solution was refluxed. After 20 hours, the ethanol was removed and NaOH
13 solution (1.5 M, 20 mL, 30.0 mmol, 15 eq.) was added, and the solution was stirred for further 20
14 h at 90 °C under N₂. For the hydrolysis, the solution was cooled in an ice bath and concentrated
15 hydrochloric acid was added until the pH is acidic. The solution was extracted with
16 dichloromethane three times and the solvent in the combined organic layers was removed. The
17 crude product was recrystallized with ethanol. The product was afforded (315 mg, 1.54 mmol, 77
18 %).
19



20
21 **Figure S1.** The ¹H-NMR spectrum of HOOC-C₉-SH.

180.45

39.01
34.02
33.91
29.17
29.05
28.89
28.36
28.22
24.53

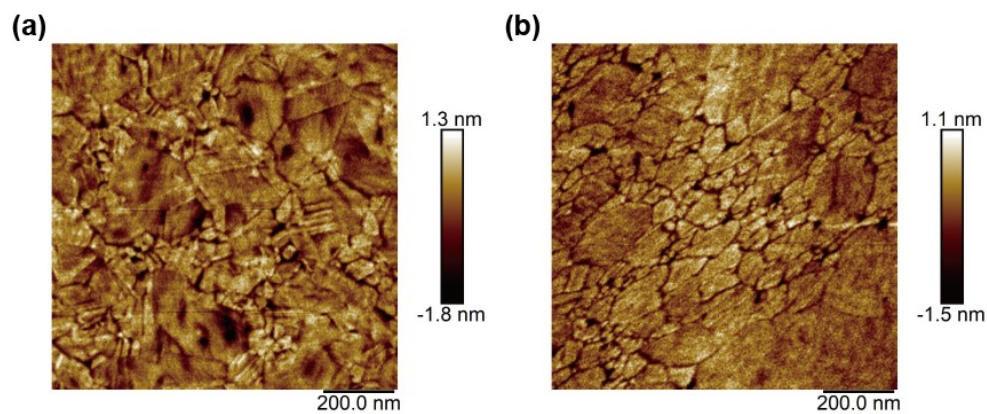


22
23 **Figure S2.** The ^{13}C -NMR spectrum of HOOC-C₉-SH.

24 ^1H NMR (400 MHz, CDCl₃) δ 9.77 (s, 1H), 2.51 (dd, J = 14.7, 7.4 Hz, 2H), 2.33 (t, J = 7.5 Hz,
25 2H), 1.70 – 1.49 (m, 4H), 1.43 – 1.22 (m, 11H).

26 ^{13}C NMR (100 MHz, CDCl₃) δ 180.45, 39.01, 34.02, 33.91, 29.17, 29.05, 28.89, 28.36, 28.22,
27 24.53.

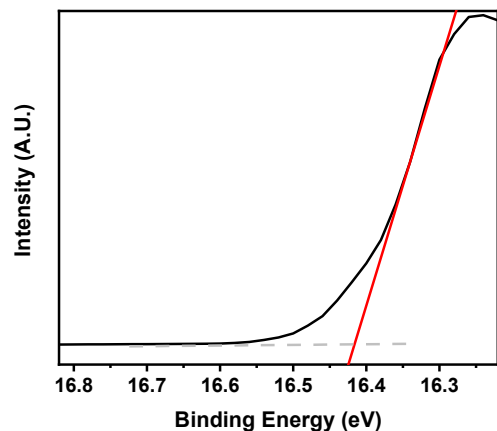
28 HRMS (APCI+): m/z calc for C₁₀H₂₀O₂S [M-H]⁺ 203.1106, found 203.113.



29
30 **Figure S3.** (a) The AFM images of template stripped Au (b) The AFM images of template stripped
31 Ag.

32 The Atomic Force Microscope (AFM) images were measured by Bruker Dimension Icon
33 AFM with peak force tapping mode (ScanAsyst-Air, resonant frequency: 70 KHz, spring constant:
34 0.4 N/m). The AFM software (NanoScope Analysis) was used to analyze the AFM images for
35 topography and roughness.

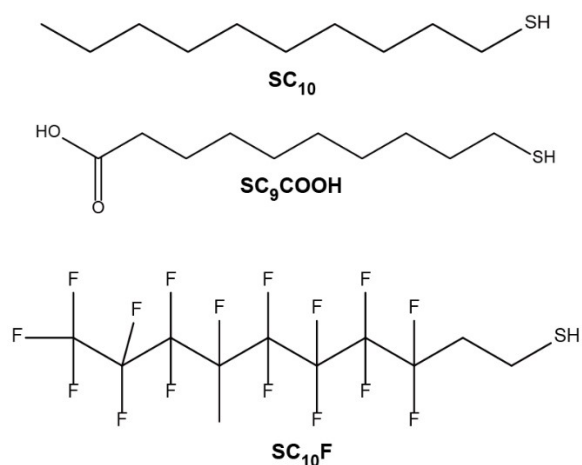
36



37

38 **Figure S4.** Secondary electron cut-off spectra of IG-CB recorded using the UPS technique.

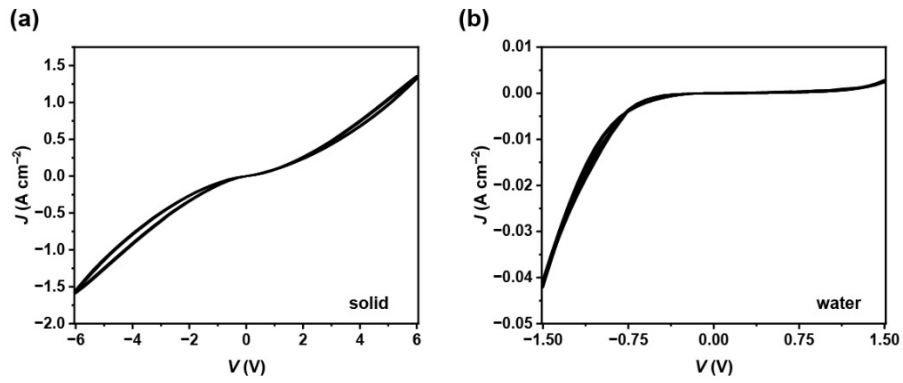
39



40

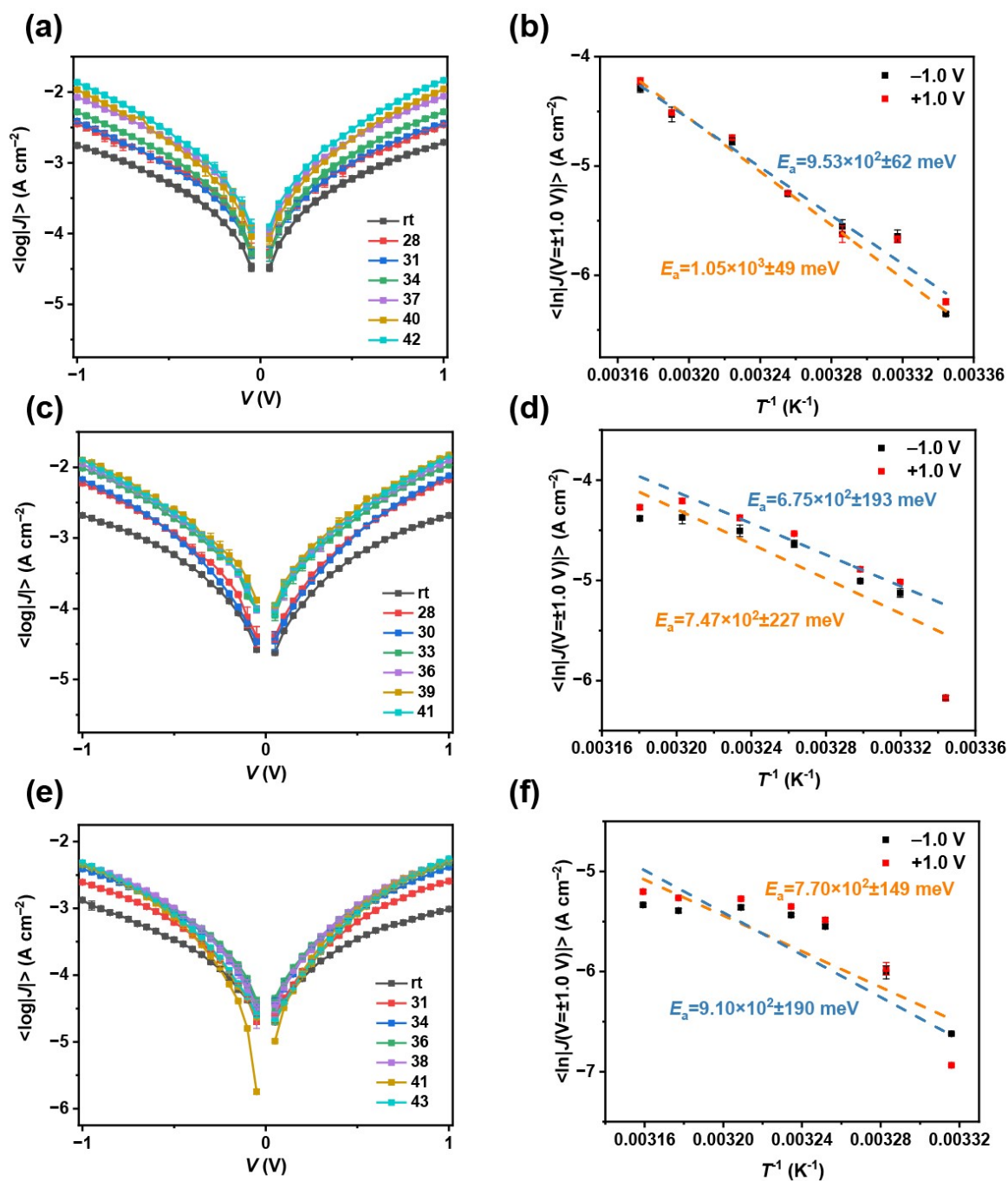
41 **Figure S5.** The structure of three molecules.

42



43
44 **Figure S6.** The limitation voltage of IG-CB electrode.

45



46

47 **Figure S7.** The repeatability of T -dependent experiment in -COOH//Mb junctions.

48

49 [1] D. J. Yoo, K.-S. Lee, A. R. Kim, K. S. Nahm, *Korean Chem. Eng. Res.* **2010**, *49*, 330.

50