Supplementary Contents of

Thermal Stability of Epitaxial Graphene Electrodes for Conductive Polymer Nanofiber Devices

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1. Au-PANI devices (Au1 – Au-6)

We deposited Ti/Au (5/50 nm) electrodes on a double layer PMMA mask fabricated by electron beam lithography and lifted-off the Ti/Au in organic solvent (See Methods). We deposited polyaniline nanofibers everywhere on the pre-made devices, then we inspected under microscope and selected those devices in which a single fiber is contacted (Au3, Au4, Au5). We also selected three (Au2) and four fibers (Au1, Au6) contacted on Au electrodes and compared their average conductivity with single fiber devices. Figure S1 – S4 show atomic force microscope (AFM) images and current-voltage (*I*-*V*) measurements of these devices and Table S1 summarize the height, inter-electrode distance and electrical conductivity of the contacted nanofibers.

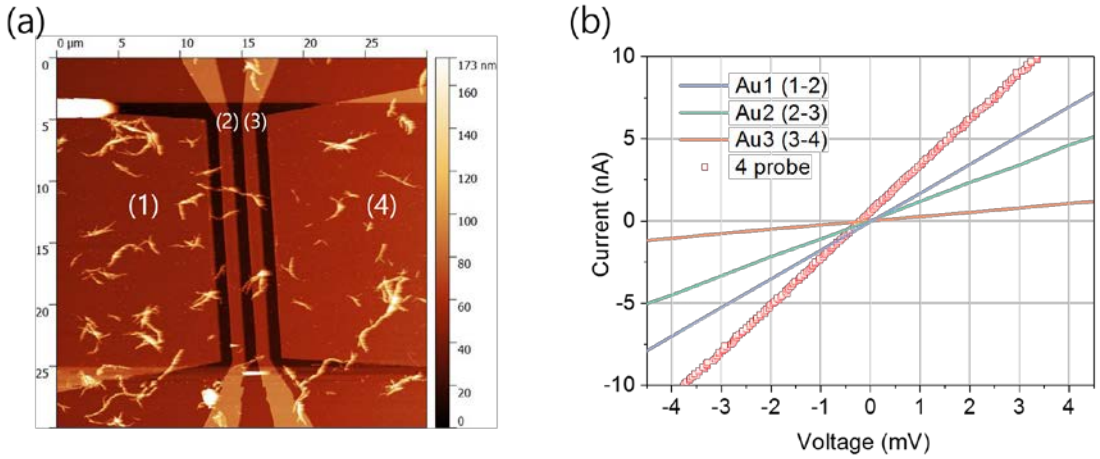

Figure S1. Device Au1–Au3 (a) Atomic force microscope topography of PANI contacted between Au contacts 1-2, 2-3, and 3-4 (Au1, Au2, Au3, respectively). (b) Current-Voltage characteristics of PANI nanofibers contacted between contact 1-2 (Au1), 2-3 (Au2), 3-4 (Au3), and four-probe measurement.

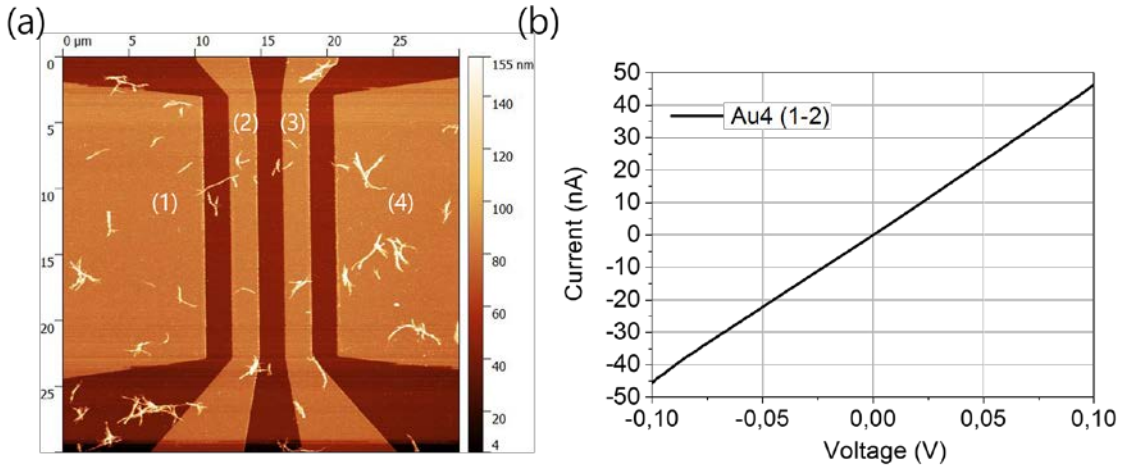

Figure S2. Device Au4 (a) Atomic force microscope topography of PANI contacted between Au contacts 1-2 (Au4). (b) Current-Voltage characteristics of the PANI nanofiber contacted between contacts 1-2 (Au4).

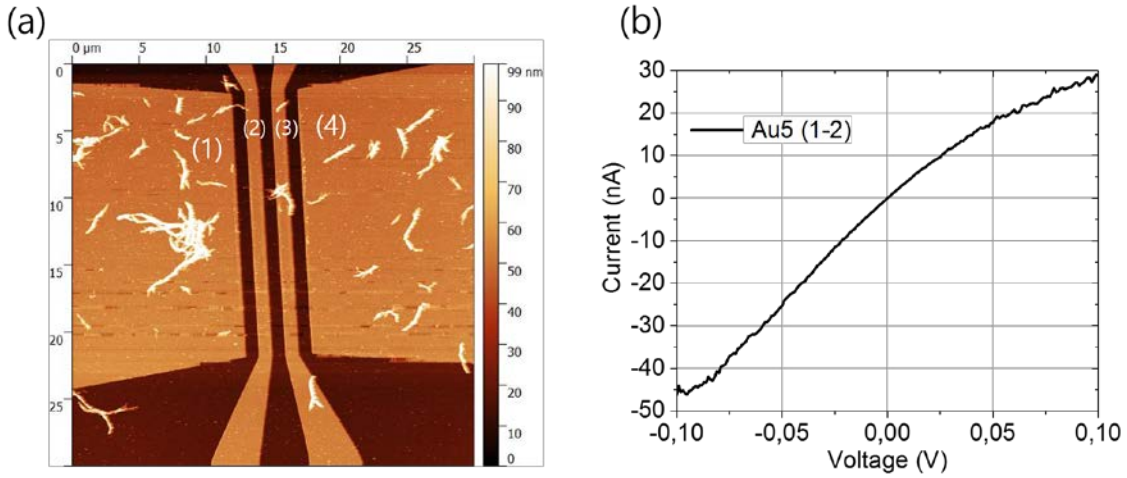

Figure S3. Device Au5 (a) Atomic force microscope topography of PANI contacted between Au contacts 1-2 (Au5). (b) Current-Voltage characteristics of the PANI nanofiber contacted between contacts 1-2 (Au5)

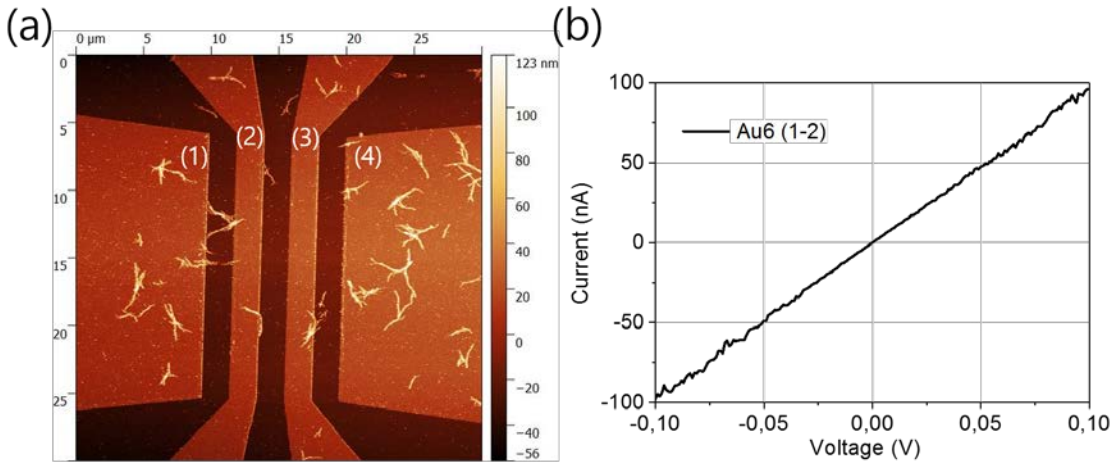

Figure S4. Device Au6 (a) Atomic force microscope topography of PANI contacted between Au contacts 1-2 (Au6). (b) Current-Voltage characteristics of the PANI nanofibers contacted between contacts 1-2 (Au1).

Table 1. Summary of PANI-Au devices (Au1 – Au6) in height, source-drain distance, and conductivity

Contacts	Height (nm)	Distance (μm)	Conductivity (S/cm)
Au1	100, 26, 65, 65	1	1.2
Au2	64, 65, 80	1	1.2
Au3	66	5	3.6
Au4	48	2	5
Au5	50	1	2.5
Au6	120, 70, 45	2	1.2

2. G/SiC-PANI devices (G1 – G4)

We patterned the epitaxial graphene and deposited polyaniline nanofibers everywhere on pre-made graphene electrodes, then we inspected under microscope and selected those devices in which a single fiber is contacted (G1, G2, G3) and three fibers are contacted (G4). Figure S5 – S7 show AFM images and *I-V* measurements of these devices and Table S2 summarize the height, inter-electrode distance and electrical conductivity of the contacted nanofibers.

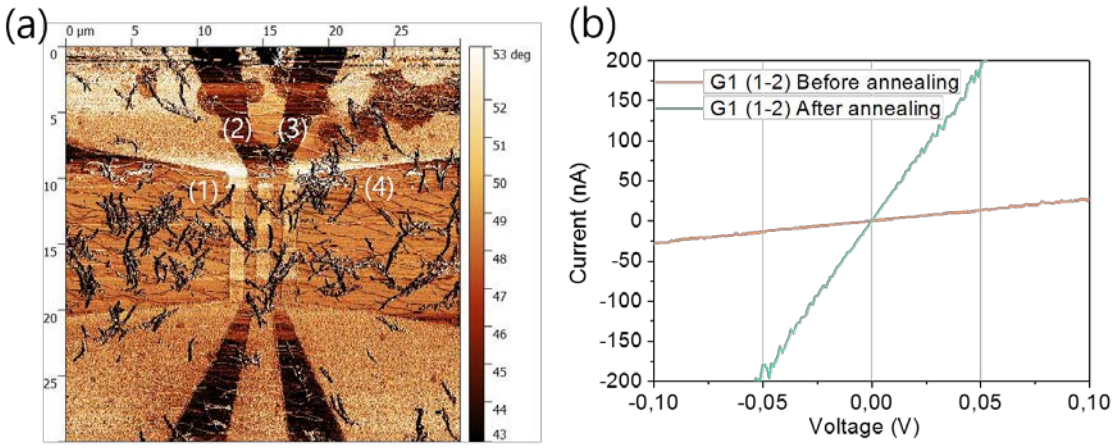

Figure S5. Device G1 (a) AFM phase of PANI contacted between G/SiC contacts 1-2 (G1). We checked that the electrodes (1) and (2) were electrically insulating before nanofiber deposition. ((2) and (3) were electrically shorted due to incomplete graphene etching as shown in the AFM phase image). (b) Current-Voltage characteristics of the PANI nanofiber contacted between contacts 1-2 (G1) before and after T = 800 °C annealing. In this device, the electrical resistance decreased after annealing.

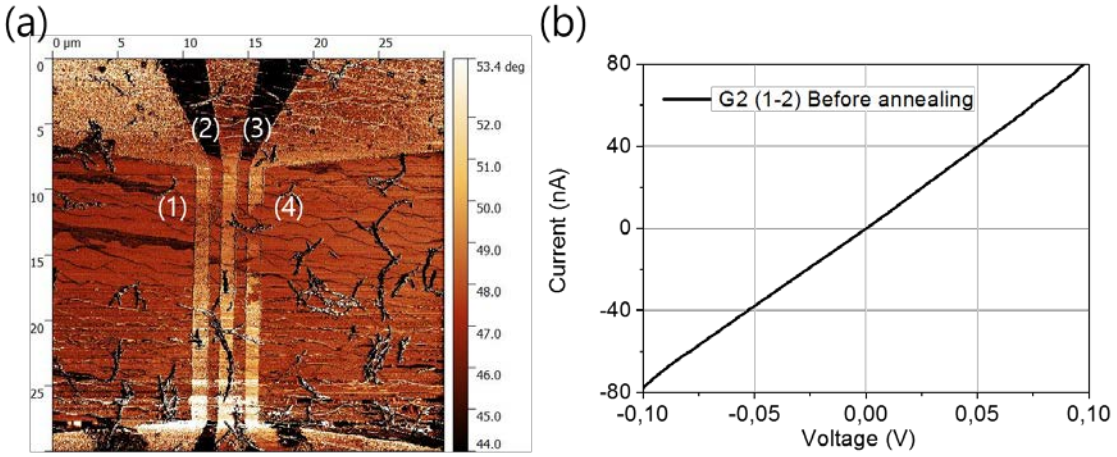

Figure S6. G2 (a) AFM phase of PANI contacted G/SiC contact 1-2 (G2). We checked that the electrodes (1) and (2) were electrically insulating before nanofiber deposition. (b) Current-Voltage characteristics of the PANI nanofiber contacted between contact 1-2 (G2) before T = 800 °C annealing. After annealing the nanofiber was cut and not conductive.

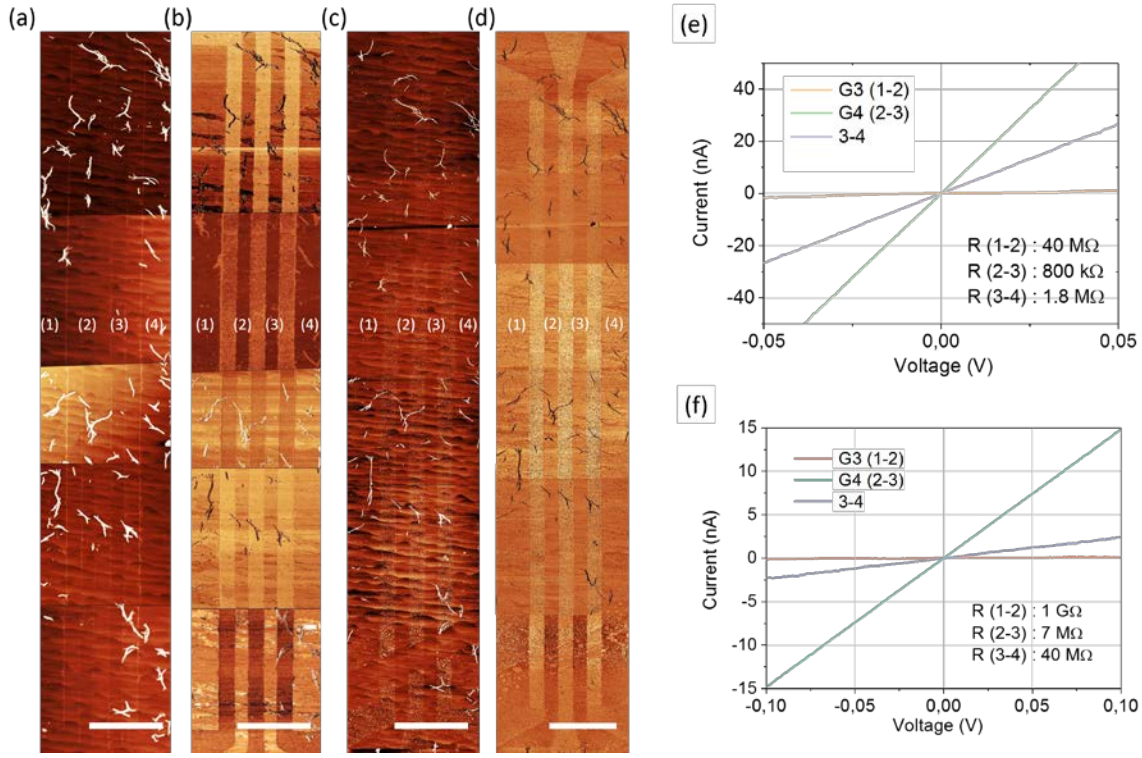

Figure S7. G3 and G4 AFM topography (a) and phase (b) of PANI contacted G/SiC on contact 1-2 (G3), 2-3 (G4), and 3-4. The device shown in Fig. 3 is G4 and among the three PANI nanofibers in G4, the nanofiber in Fig. 3 is in the middle of the electrode. We checked that the electrodes (1), (2), (3), and (4) were electrically insulating each other before nanofiber deposition. (c) and (d) are the AFM topography and phase after T = 800 ° C annealing, respectively. (e) Current-Voltage characteristics of the PANI nanofiber contacted between contacts 1-2 (G3), 2-3 (G4), and 3-4 before T = 800 °C annealing. (f) Current-Voltage characteristics of the PANI nanofiber contacted between contacts 1-2 (G3), 2-3 (G4), and 3-4 after T = 800 °C annealing. Scale bars in (a)–(d) are 10 um.

Table 2. Summary of PANI-G/SiC devices (G1 – G6) in height, source-drain distance, and conductivity

Contacts	Height (nm)	Distance (μm)	Conductivity (S/cm)
G1	110	2	0.6
G2	65	1	2.3
G3	55	2	0.4
G4	100, 64, 65	2	1.8