

Supporting Information

Importance of Diameter Control on Selective Synthesis of Semiconducting Single-
Walled Carbon Nanotubes

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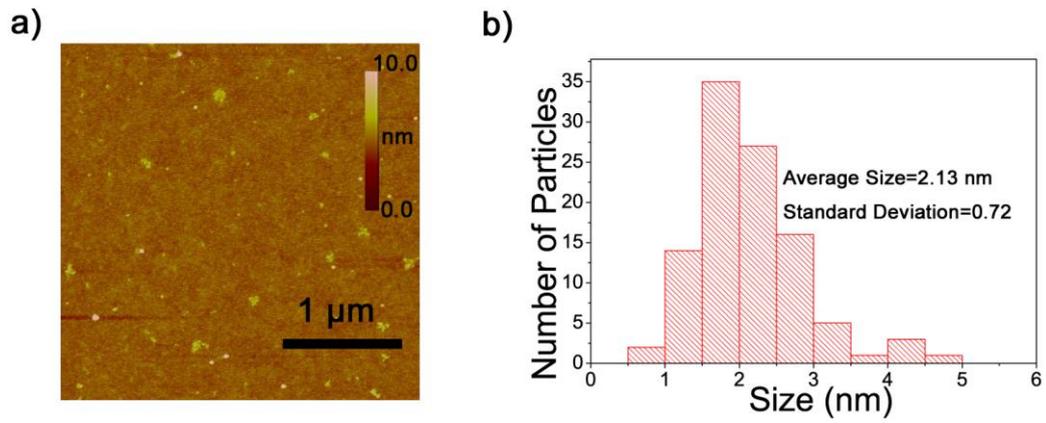


Figure S1. AFM image (a) and size distribution (b) of Fe nanoparticles with a diluted density ($\sim 1/10$ of those in Figure 1c) on the SiO₂/Si substrate.

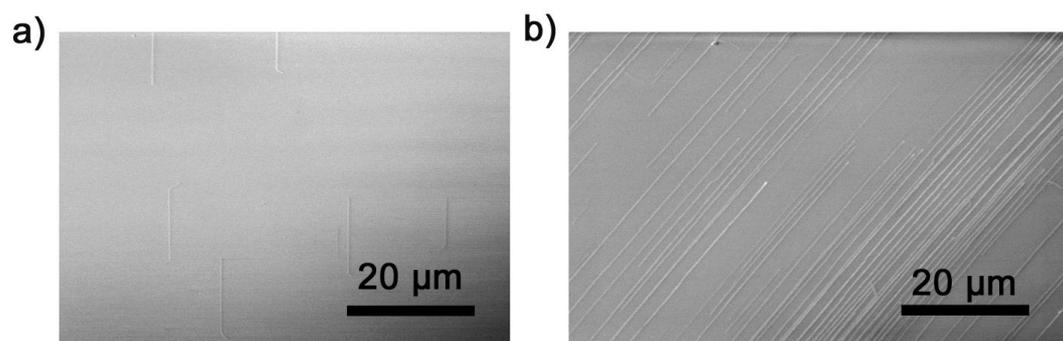


Figure S2. SEM images of Fe–W-catalyzed (a) and Fe-catalyzed (b) SWNTs on quartz substrates.

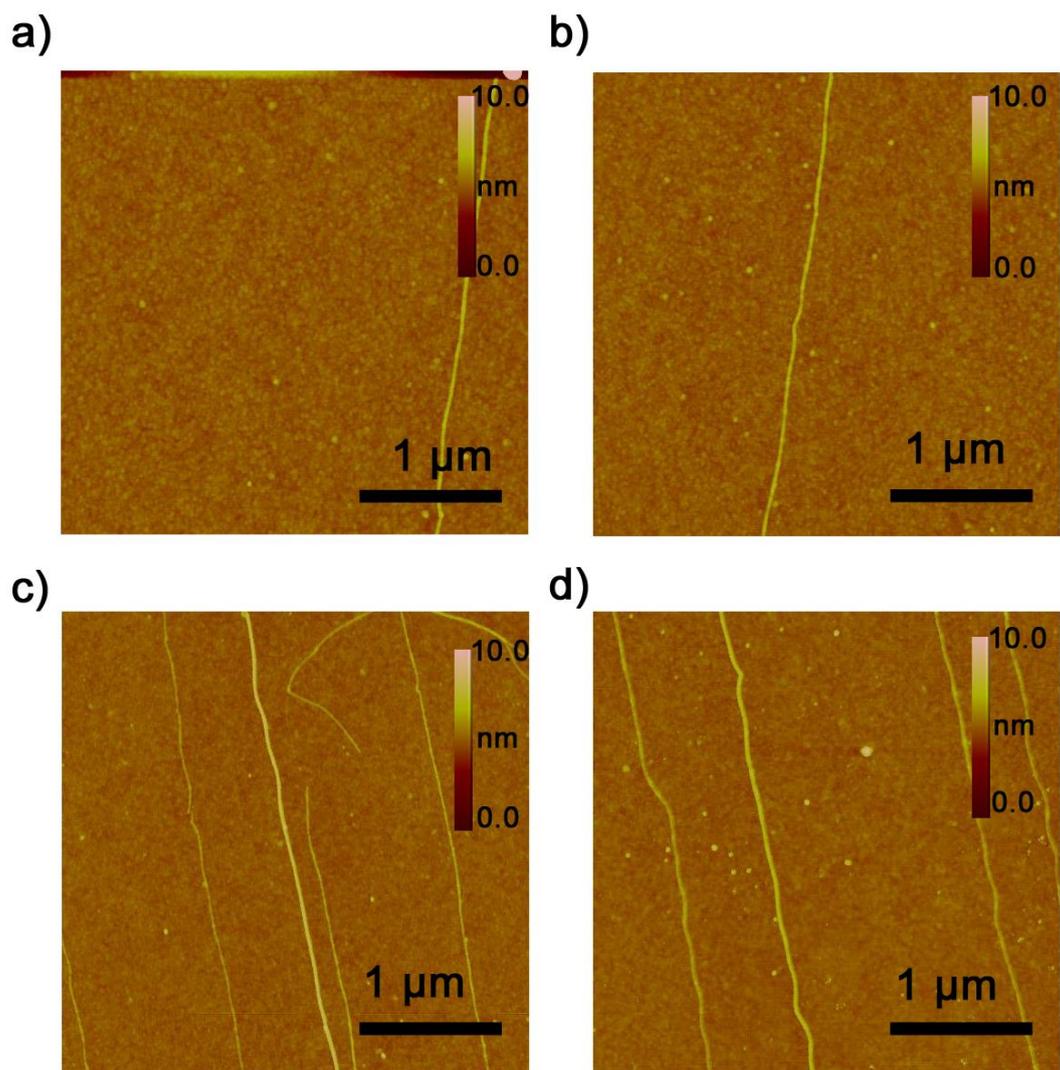


Figure S3. AFM images of Fe–W-catalyzed (a, b) and Fe-catalyzed SWNTs (c, d) (synthesized on quartz and transferred to SiO₂/Si substrates).

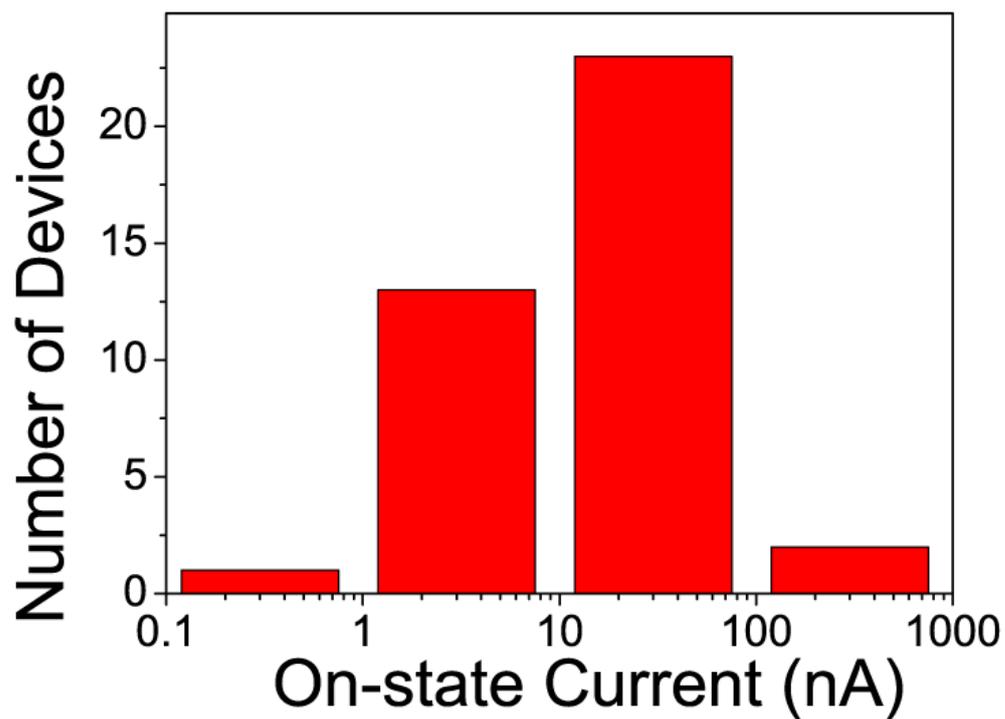


Figure S4. Statistics of the on-state current of devices based on individual Fe-W-catalyzed SWNTs synthesized under a water vapor concentration of 1036 ppm ($V_{DS}=10$ mV).

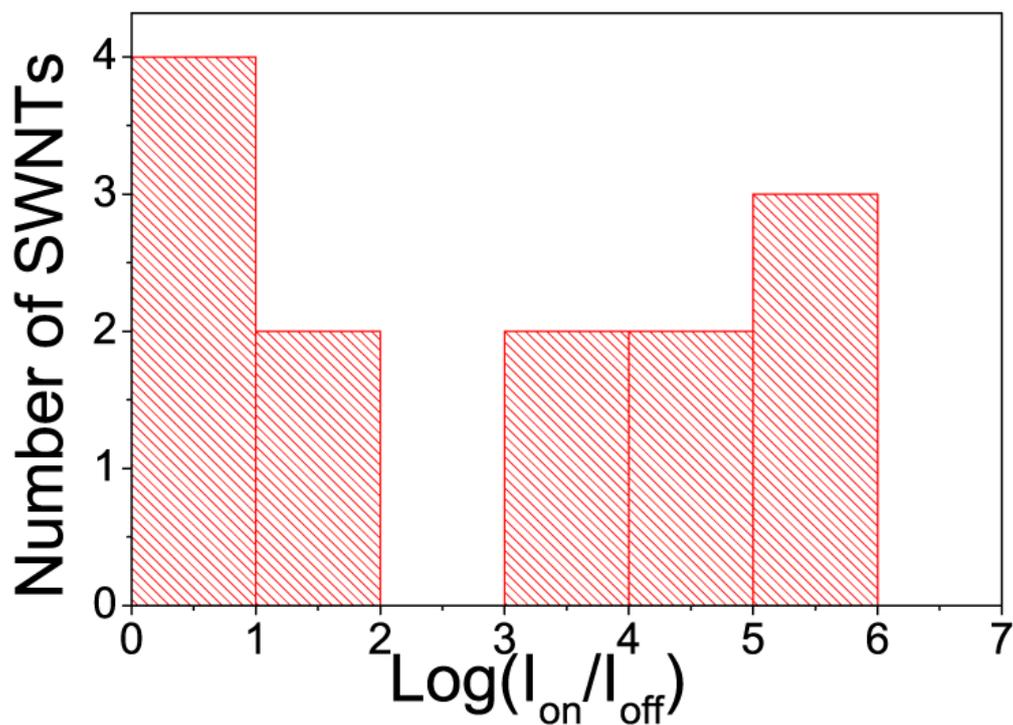


Figure S5. Histograms of the on/off ratio of each individual tube device for Fe–W-catalyzed SWNTs synthesized with a water vapor concentration of 2629 ppm.

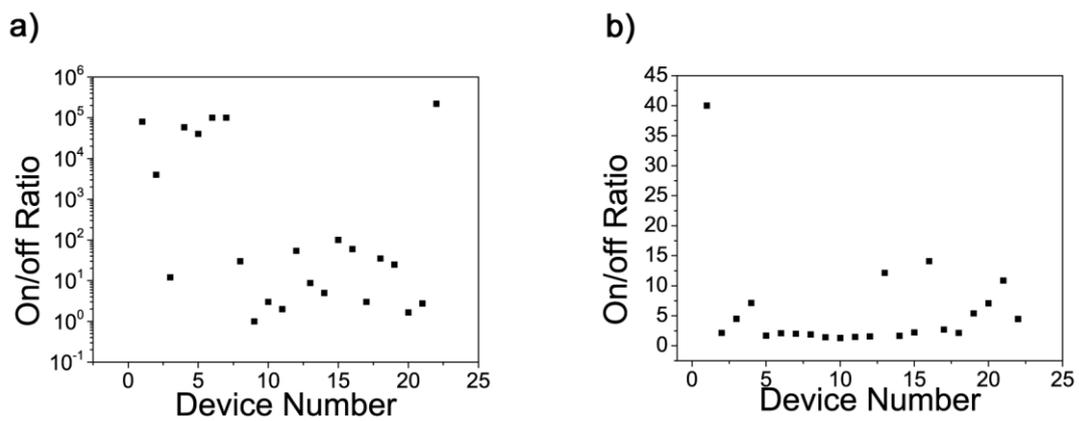


Figure S6. Displays of the on/off ratio of the multiple-tube devices in Figure 4c and Figure 4d for Fe–W-catalyzed SWNTs (a) and Fe-catalyzed SWNTs (b) under the optimized etching conditions.

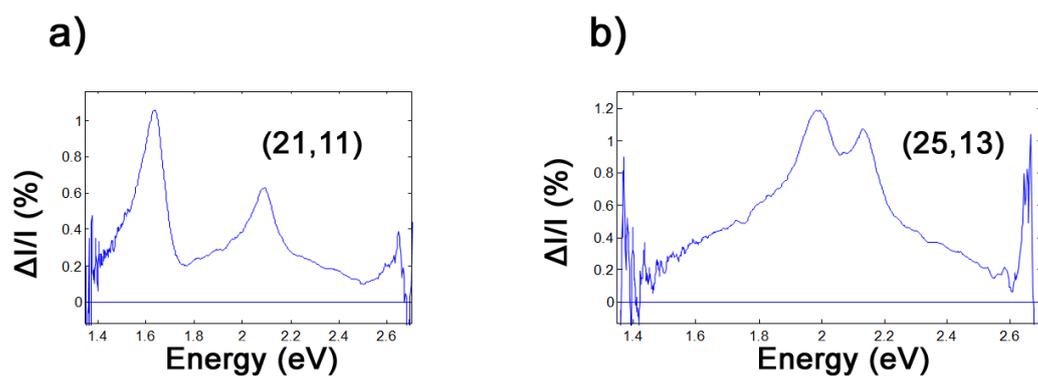


Figure S7. Optical spectra of a (21,11) s-SWNT (a) and a (25,13) m-SWNT (b). The diameters of the s-SWNT and m-SWNT were calculated to be 2.21 nm and 2.62 nm, respectively.

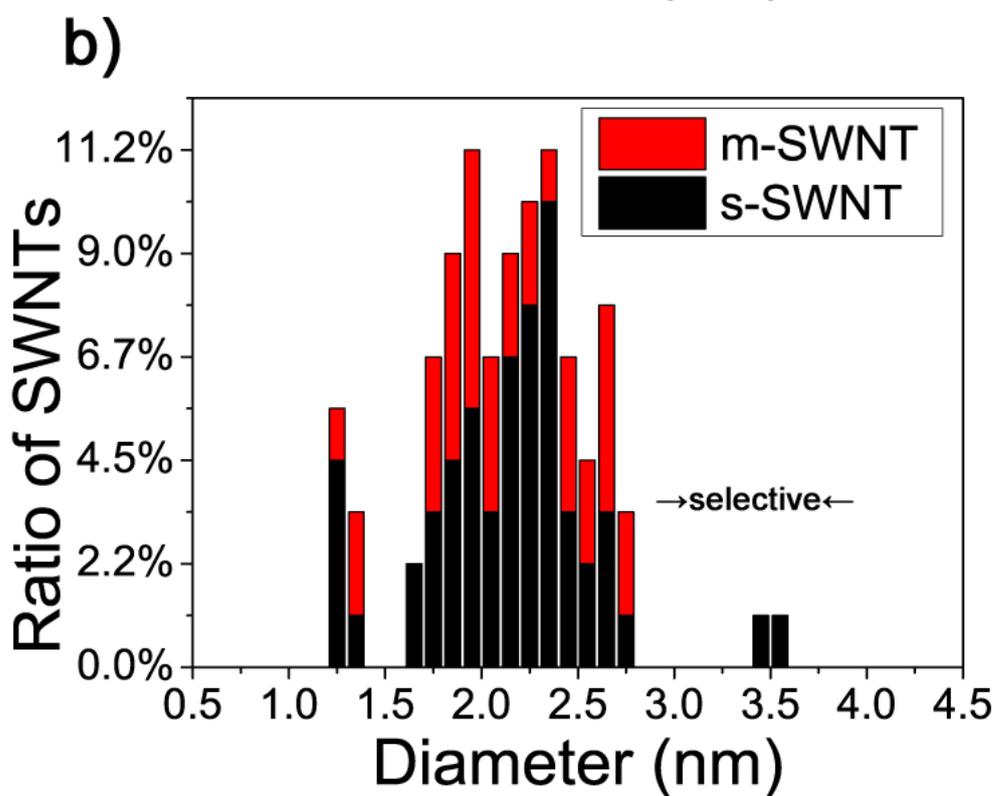
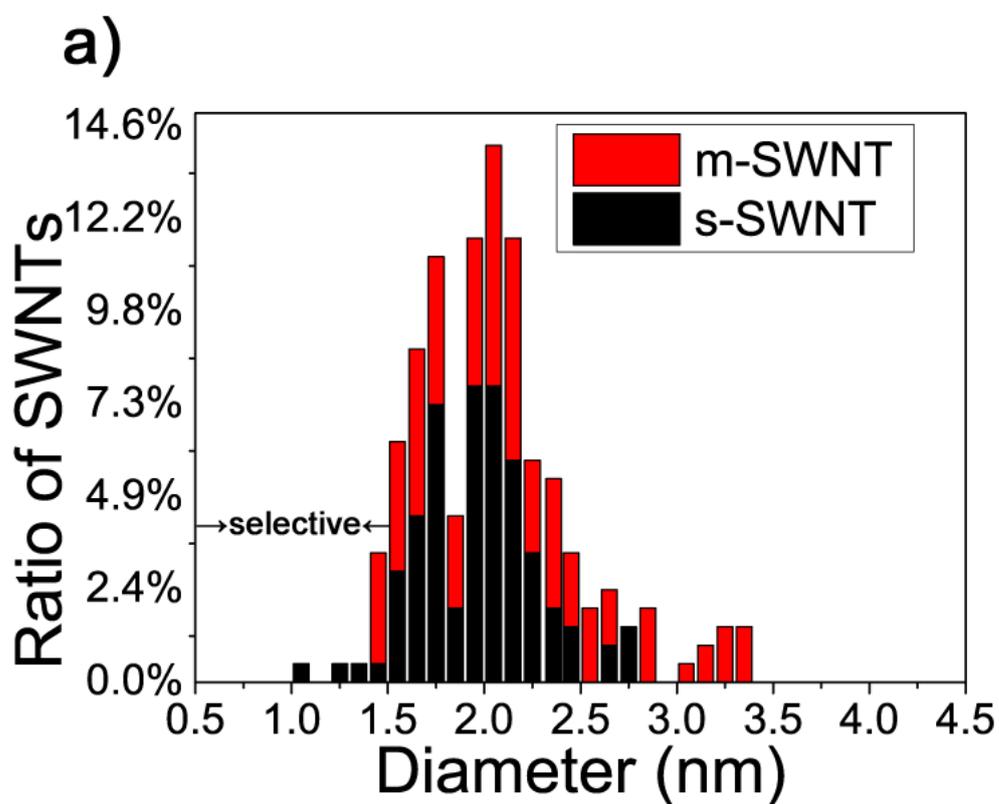


Figure S8. Chirality and diameter distributions of Fe-catalyzed SWNTs synthesized without water vapor (a) and under a water vapor concentration of 2541 ppm (b).

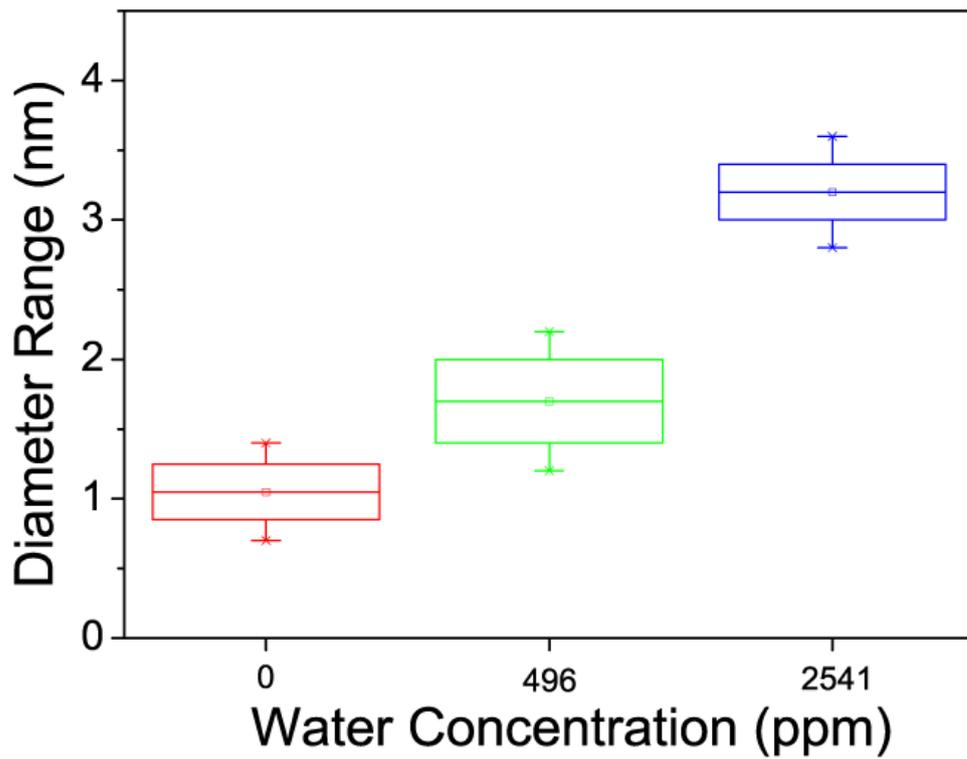


Figure S9. Selective etching windows of Fe-catalyzed SWNTs under a water vapor concentration of 0 (red), 496 ppm (green) and 2541 ppm (blue).

Table S1. Chiralities of Fe–W-catalyzed SWNTs synthesized with water vapor concentration of 522 ppm.

Number	Electronic Type	n	m
1	Semiconducting	16	15
2		18	17
3		22	12
4		23	6
5		25	21
6		22	9
7		27	8
8		24	14
9		25	17
10		19	14
11		33	4
12		28	9
13		16	15
14		24	11
15		21	7
16		22	18
17		24	11
18		20	13
19		17	16
20		22	12
21		24	11
22		16	15
23		25	12
24		32	9
25		23	10
26		23	18
27		19	18
28		23	22
29		18	17
30		25	8
31		27	14
32		20	16
33		15	14
34		19	18
35		32	4
36		33	1
37		27	5

38		16	15
39		22	6
40		21	20
41		20	15
42		18	17
43	Semimetallic	19	16
44		22	10
45		34	16
46		20	11
47		30	24
48		33	12
49		27	24
50		30	24
51		37	13
52	Metallic	20	20