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Tuning Carbon Nanotube Assembly for Flexible Strong and Conductive Film

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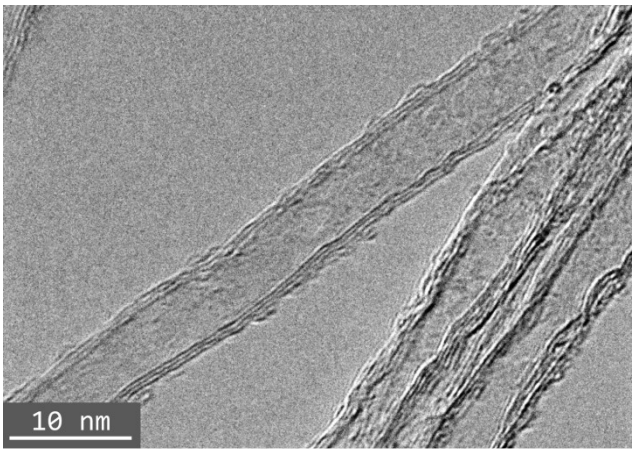

Figure S1. TEM image of array CNTs.

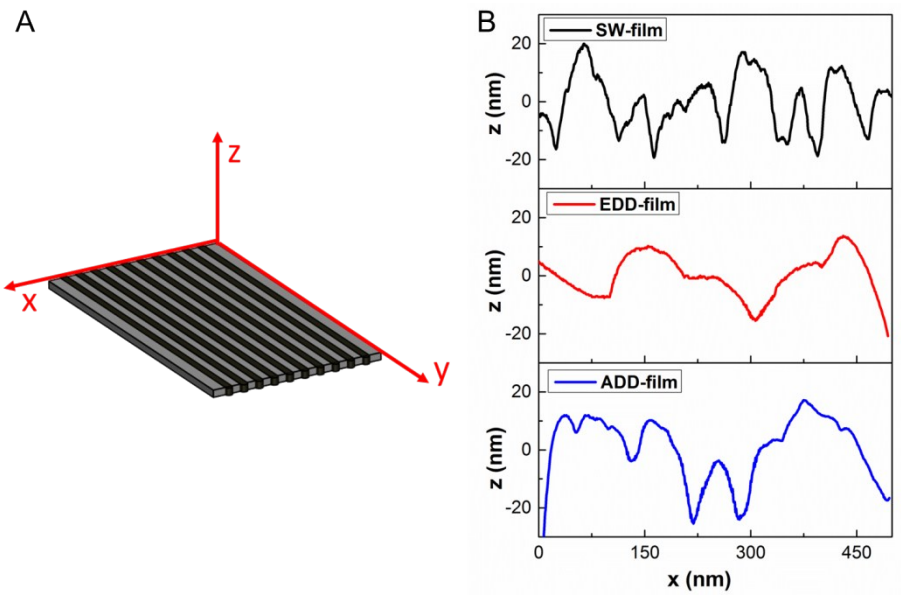

Figure S2. (A) Schematic diagram defining the directions of the aligned CNT film. (B) The surface height curves of x-z cross-section of SW-film, EDD-film and ADD-film. The curves were obtained by AFM and the range of convex part could reflect bundle's size.

Table S1. Properties comparison between the pure CNT films of this work with other CNT films/fibers spun from CNT array in references.

Film Type	CNT Type	Tensile Strength [GPa]	Tensile Modulus [GPa]	Reference
As-spun film	FWCNT	0.19±0.02	14±2	This work
SW-film	FWCNT	1.08±0.07	43±5	This work
EDD-film	FWCNT	2.58±0.15	124±14	This work
ADD-film	FWCNT	3.19±0.10	102±9	This work
Pure film	MWCNT	0.008	0.785	[1]
As-spun film	MWCNT	0.092	3	[2]
Pure film	MWCNT	0.46	-	[3]
Pure film	MWCNT	0.14	7	[4]
Pure film	MWCNT	0.41±0.04	11±2	[5]
Pure film	MWCNT	1.01±0.18	12±3	[5]
Pure film	FWCNT	0.52±0.04	20±4	[5]
Pure film	FWCNT	1.66±0.27	60±8	[5]
Pure film	FWCNT	2.0	90	[6]
Pure Fiber	FWCNT	1.17	53.5	[7]
Pure Fiber	FWCNT	1.23	40-50	[8]
Pure Fiber	FWCNT	0.93	29.7	[9]
Pure Fiber	FWCNT	0.65	42	[10]
Pure Fiber	MWCNT	0.6	37	[11]
Pure Fiber	MWCNT	1.6	110	[12]
Pure Fiber	MWCNT	1.2±0.3	43.3±7.4	[13]

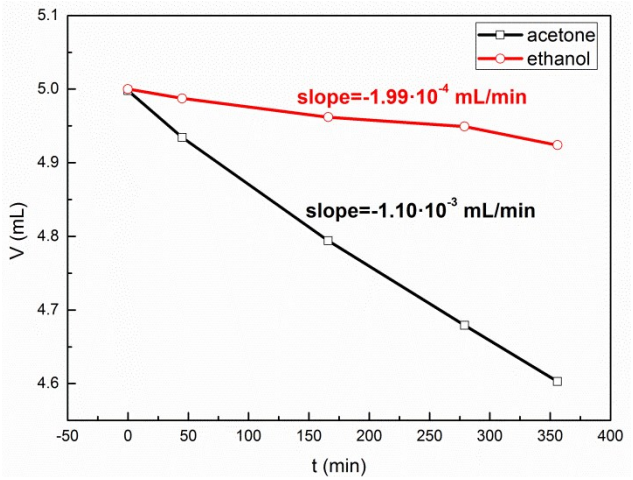

Figure S3. The measured evaporation rates of ethanol and acetone using a 5 mL graduated cylinder (25 ^{o}C, RH 50%).

1 G. Xu, Q. Zhang, W. Zhou, J. Huang, F. Wei, *Appl. Phys. A: Mater. Sci. Process.*, 2008, **92**, 531.
2 X. Wang, P. D. Bradforda, W. Liu, H. Zhao, Y. Inoueb, J. P. Mariaa, Q. Li, F. G. Yuan, Y. Zhu, *Compos. Sci. Technol.*, 2011, **71**, 1677.
3 W. Liu, X. Zhang, G. Xu, P. D. Bradford, X. Wang, H. Zhao, Y. Zhang, Q. Jia, F. Yuan, Q. Li, Y. Qiu, Y. Zhu, *Carbon*, 2011, **49**, 4786.
4 W. Liu, H. Zhao, Y. Inoue, X. Wang, P. D. Bradford, H. Kim, Y. Qiu, Y. Zhu, *Composites, Part A*, 2012, **43**, 587.
5 Y. Liu, M. Li, Y. Gu, K. Wang, D. Hu, Q. W. Li, Z. G. Zhang, *Carbon*, 2013, **65**, 187.
6 J. T. Di, D. M. Hu, H. Chen, Z. Yong, M. Chen, Z. Feng, Y. Zhu, Q. Li, *ACS Nano*, 2012, **6**, 5457.
7 J. Jia, J. Zhao, G. Xu, J. Di, Z. Yong, Y. Tao, C. Fang, Z. Zhang, X. Zhang, L. Zheng, Q. Li, *Carbon*, 2011, **49**, 1333.
8 J. Zhao, X. Zhang, J. Di, G. Xu, X. Yang, X. Liu, Z. Yong, M. Chen, Q. Li, *Small*, 2010, **6**, 2612.
9 F. Meng, J. Zhao, Y. Ye, X. Zhang, S. Li, J. Jia, Z. Zhang, Q. Li, *J. Mater. Chem.*, 2012, **22**, 16277.
10 G. Xu, J. Zhao, S. Li, X. Zhang, Z. Yong, Q. Li, *Nanoscale*, 2011, **3**, 4215.
11 X. Zhang, K. Jiang, C. Feng, P. Liu, L. Zhang, J. Kong, T. Zhang, Q. Li, S. Fan, *Adv. Mater.*, 2006, **18**, 1505.
12 K. Liu, F. Zhu, L. Liu, Y. Sun, S. Fan, K. Jiang, *Nanoscale*, 2012, **4**, 3389.
13 M. Zu, Q. Li, Y. Zhu, M. Dey, G. Wang, W. Lu, J. M. Deitzel, J. W. Gillespie Jr., J. H. Byun, T. W. Chou, *Carbon*, 2012, **5**0, 1271.