

Electronic Supplementary Information for *Soft Matter* Transcript: Bending Behavior of CNT Fibers and their Scaling Laws

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Table 1: CNT fiber diameter measurements in μm

CNT Length $2.21 \pm 0.24 \mu\text{m}$	CNT Length $4.17 \pm 0.17 \mu\text{m}$	CNT Length $6.28 \pm 0.14 \mu\text{m}$	CNT Length $6.28 \pm 0.14 \mu\text{m}$	CNT Length $6.28 \pm 0.14 \mu\text{m}$
Spinneret Diameter $150 \mu\text{m}$	Spinneret Diameter $150 \mu\text{m}$	Spinneret Diameter $150 \mu\text{m}$	Spinneret Diameter $125 \mu\text{m}$	Spinneret Diameter $100 \mu\text{m}$
21.01	21.16	22.11	21.22	12.02
21.43	21.61	21.09	17.74	13.36
22.62	22.83	20.62	16.21	12.45
23.64	22.02	19.48	17.43	12.63
22.62	21.61	22.67	15.89	11.43
22.22	21.73	25.55	16.35	12.78
21.41	22.02	20.85	15.43	12.32
22.42	21.81	20.55	16.36	12.69
23.23	22.00	22.94	16.54	11.46
22.62	23.03	22.48	22.90	13.31
22.02	21.82	23.77	22.45	
23.63	22.02	24.80		
	21.82	20.25		
	23.03	20.23		
	22.62			

Table 2: CNT fiber linear density in mg/m

CNT Length $2.21 \pm 0.24 \mu\text{m}$	CNT Length $4.17 \pm 0.17 \mu\text{m}$	CNT Length $6.28 \pm 0.14 \mu\text{m}$	CNT Length $6.28 \pm 0.14 \mu\text{m}$	CNT Length $6.28 \pm 0.14 \mu\text{m}$
Spinneret Diameter $150 \mu\text{m}$	Spinneret Diameter $150 \mu\text{m}$	Spinneret Diameter $150 \mu\text{m}$	Spinneret Diameter $125 \mu\text{m}$	Spinneret Diameter $100 \mu\text{m}$
0.556	0.515	0.486	0.461	0.623
0.565	0.506	0.471	0.480	0.553
0.569	0.526	0.482	0.465	0.581
			0.468	0.609
				0.595
				0.581

Table 3: CNT fiber tensile modulus (E_M) measurements in GPa

CNT Length $2.21 \pm 0.24 \mu\text{m}$	CNT Length $4.17 \pm 0.17 \mu\text{m}$	CNT Length $6.28 \pm 0.14 \mu\text{m}$	CNT Length $6.28 \pm 0.14 \mu\text{m}$	CNT Length $6.28 \pm 0.14 \mu\text{m}$
Spinneret Diameter $150 \mu\text{m}$	Spinneret Diameter $150 \mu\text{m}$	Spinneret Diameter $150 \mu\text{m}$	Spinneret Diameter $125 \mu\text{m}$	Spinneret Diameter $100 \mu\text{m}$
72.5	126.0	151.3	168.3	160.8
66.2	129.2	135.1	192.7	151.8
79.0	130.3		158.7	131.9
	231.2			
	192.9			

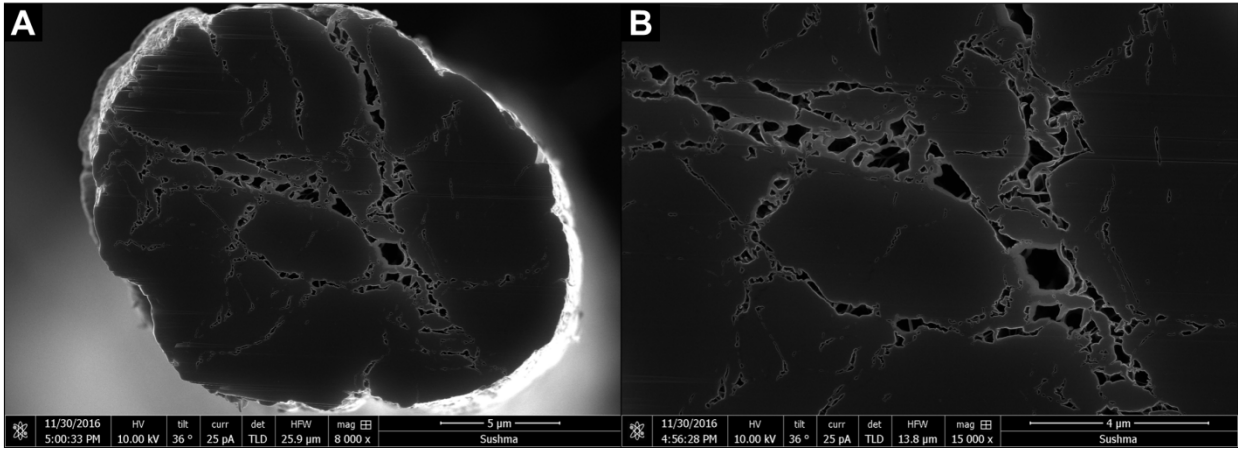


Figure 1: Cross-section HR-SEM of Meijo EC1.5 with CNT length $4.17 \pm 0.17 \mu\text{m}$. (A) Overall view and magnification with evidence of the voids in the fiber. (B) A close-up showing nanotubes fibrils bridging the voids.

Table 4: CNT fiber bending stiffness measurements (κ) in $\text{mN}\cdot\text{mm}^2$ for varying spinneret diameters and a fixed CNT length of $6.28 \pm 0.14 \mu\text{m}$.

Spinneret Diameter 100 μm		Spinneret Diameter 125 μm		Spinneret Diameter 150 μm	
Cantilever Length mm	Bending Stiffness $\text{mN}\cdot\text{mm}^2$	Cantilever Length mm	Bending Stiffness $\text{mN}\cdot\text{mm}^2$	Cantilever Length mm	Bending Stiffness $\text{mN}\cdot\text{mm}^2$
71	0.36	128	0.57	141	1.23
72	0.39	121	0.58	137	1.06
71	0.36	120	0.54	128	1.15
67	0.35	112	0.75	125	1.21
65	0.31	109	0.91	119	1.22
55	0.23	96	0.93	117	1.25
		91	0.91	116	1.21
		86	0.96	111	1.25
		82	0.90	109	1.31
		78	0.81	103	1.15
		71	0.95	99	1.06
		61	0.75	96	1.14
		52	0.73	89	1.09
				84	1.04
				80	1.21
				74	1.12
				121	0.94
				113	1.13
				112	0.97
				107	1.08
				101	1.05
				99	1.14
				94	1.18
				87	1.09
				83	1.08
				77	0.83
				74	0.84
				68	0.98
				175	1.07
				168	1.50
				163	1.15
				157	0.97
				154	0.74
				149	0.53
				143	0.91
				143	0.78
				138	0.64
				114	1.07
				110	1.02
				103	1.16
				95	1.29
				88	1.22
				81	1.13
				73	1.13
				72	1.13
				61	1.14

Table 5: CNT fiber bending stiffness measurements in $\text{mN}\cdot\text{mm}^2$ for varying CNT lengths and a fixed spinneret diameter of $150\ \mu\text{m}$.

CNT Length $2.21 \pm 0.24\ \mu\text{m}$		CNT Length $4.17 \pm 0.17\ \mu\text{m}$		CNT Length $6.28 \pm 0.14\ \mu\text{m}$	
Cantilever Length mm	Bending Stiffness $\text{mN}\cdot\text{mm}^2$	Cantilever Length mm	Bending Stiffness $\text{mN}\cdot\text{mm}^2$	Cantilever Length mm	Bending Stiffness $\text{mN}\cdot\text{mm}^2$
103	0.18	151	0.70	141	1.23
100	0.26	147	0.86	137	1.06
94	0.26	141	0.68	128	1.15
89	0.28	137	0.63	125	1.21
82	0.20	133	0.58	119	1.22
75	0.23	129	0.58	117	1.25
71	0.25	127	0.64	116	1.21
115	0.06	121	0.53	111	1.25
111	0.05	118	0.64	109	1.31
103	0.23	113	0.65	103	1.15
96	0.27	110	0.75	99	1.06
91	0.33	108	0.86	96	1.14
		103	0.89	89	1.09
		100	0.91	84	1.04
		97	0.93	80	1.21
		89	0.91	74	1.12
		66	0.86	121	0.94
				113	1.13
				112	0.97
				107	1.08
				101	1.05
				99	1.14
				94	1.18
				87	1.09
				83	1.08
				77	0.83
				74	0.84
				68	0.98
				175	1.07
				168	1.50
				163	1.15
				157	0.97
				154	0.74
				149	0.53
				143	0.91
				143	0.78
				138	0.64
				114	1.07
				110	1.02
				103	1.16
				95	1.29
				88	1.22
				81	1.13
				73	1.13
				72	1.13
				61	1.14