

Supporting Information

Electrostatically Driven Nanoballoon Actuator

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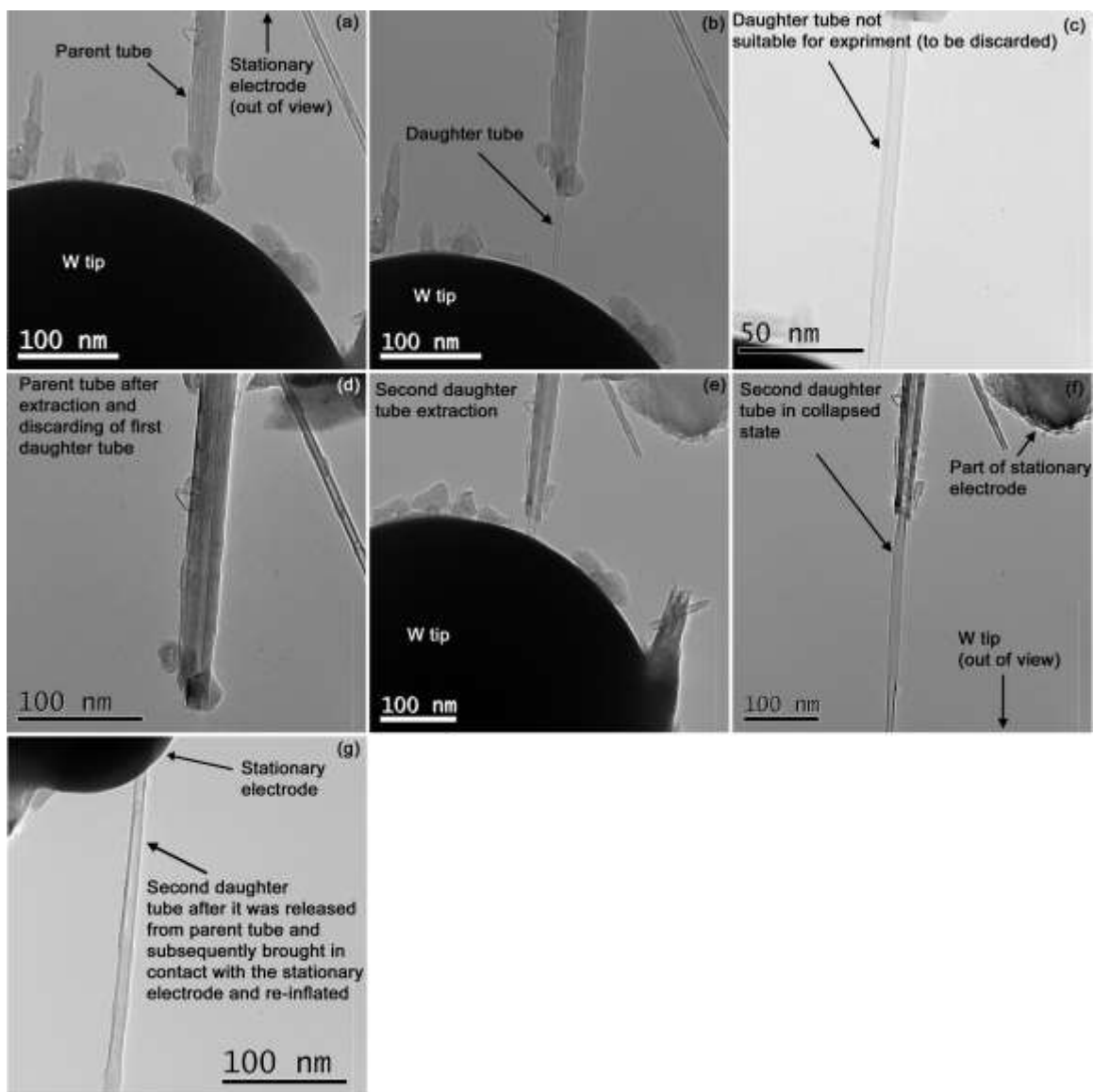


Figure S1. TEM images illustrating preparation steps of the custom-sized carbon nanotube presented in Figs. 2a,b. (a) to (c) illustrate the first inner tube extraction. The first daughter tube in (c) is not suitable for collapse/re-inflation cycling so it is discarded. (d) Parent tube after extraction of the first daughter tube. (e) Second daughter tube extraction. (f) Second daughter tube after extraction and after it has collapsed (zoomed-out image of Fig. 2a). (g) Second daughter tube after three cycles of collapse/re-inflation (zoomed-out image of Fig. 2b).

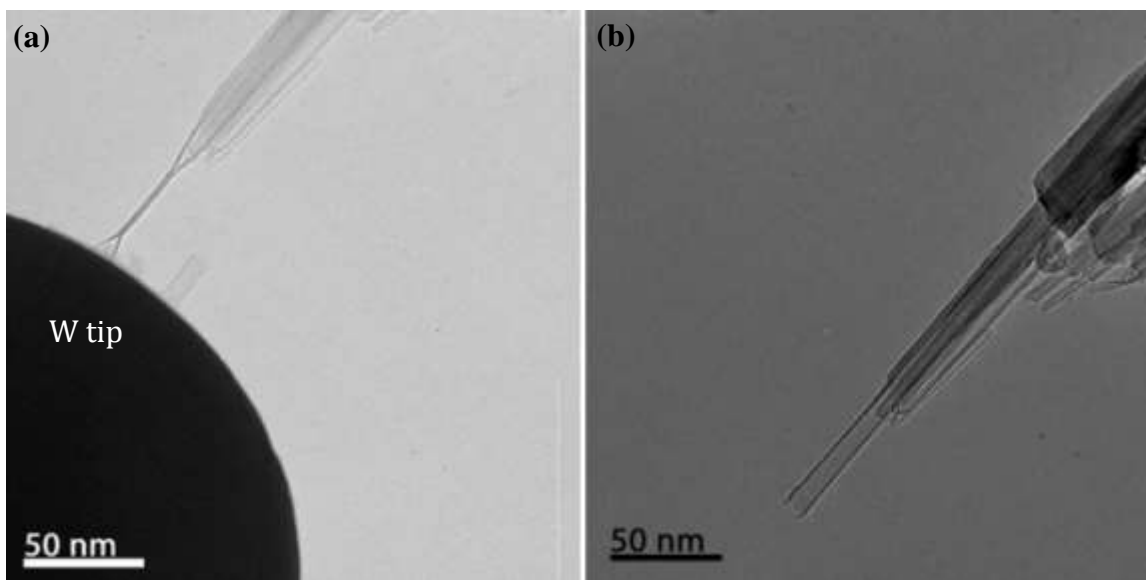


Figure S2. Zoomed-out TEM images of the nanotube in Fig. 5. (a) Side-view in collapsed state, and (b) The same tube after re-inflation. For this image the collapsed tube has been disconnected from the stationary electrode.

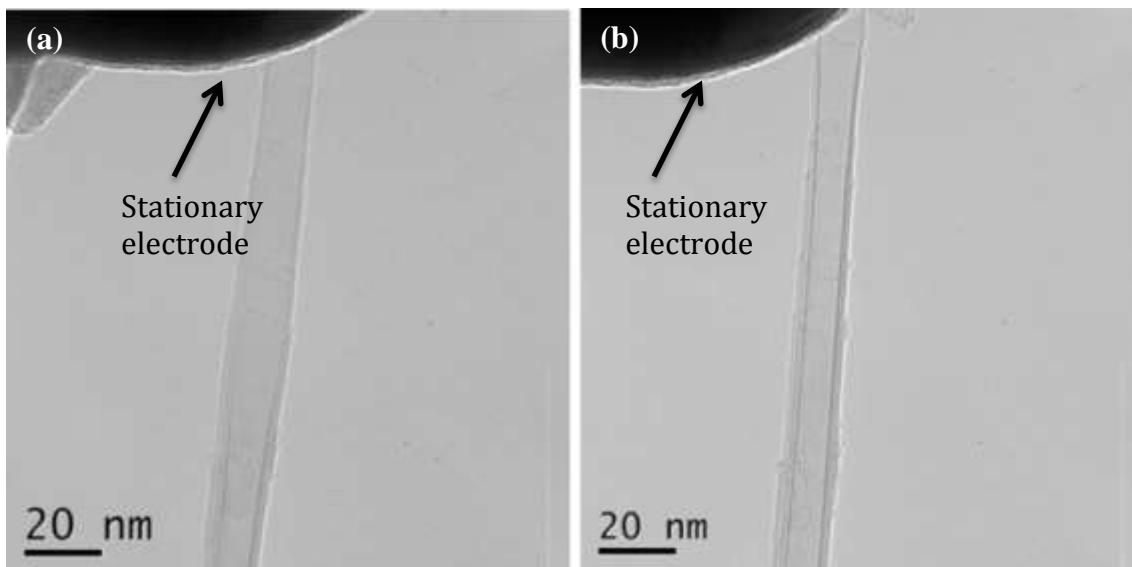


Figure S3. The same tube as that in Fig. S1g after removing the cap; (a) in collapsed state, and (b) after re-inflation.

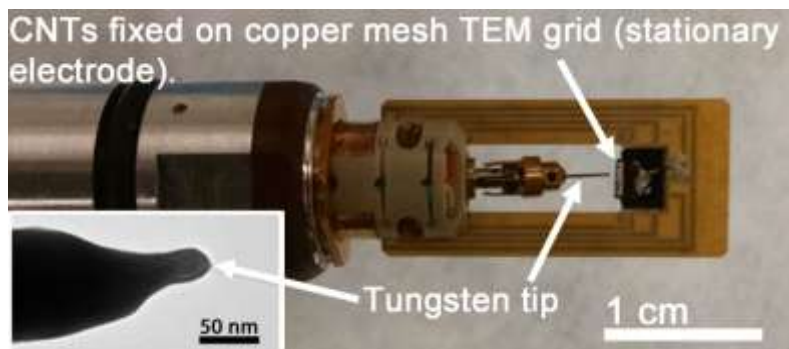


Figure S4. Photograph of the head of the nanomanipulator TEM holder. Arrows indicate the tungsten tip and copper mesh. The inset is a TEM image of a typical tungsten tip.

Table S1. List of examined tubes for collapse/re-inflation cycles together with tube specifications and applied voltage.

	<i>Diameter (nm)</i>	<i>Width after collapse (nm)</i>	<i>No. of walls</i>	<i>Collapsed (Yes/No)</i>	<i>Pinned open sides</i>	<i>Re-inflate (Yes/No)</i>	<i>Applied voltage (V)</i>
1	17	25	4	Y	0	N	Up to 20
2	24	33.3	12	Y	0	N	Up to 20
3	7.1	-	6	N	-	-	-
4	11.5	16	7	Y	1	Y	3
	11.5	16	7	Y	2	Y	3
5	31.1	40.2	5	Y	0	N	Up to 20
6	10.6	13.7	4	Y	0	N	Up to 20
7	4.4	-	3	N	-	-	-
8	20.6	30.5	9	Y	1	N	Up to 20
9	10.63	-	6	Y	2	Y	3