

## Supporting Information

Table S1 Oxidation conditions at different amount of  $\text{KMnO}_4$ .

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Table S3 Data of Raman spectra for the products formed at different temperatures.

Figure S1 TEM images of products formed at  $M_{\text{KMnO}_4}/M_{\text{F-DWCNTs}} = 2, 4, 10$  and  $15$  (a-d) at  $60\text{ }^\circ\text{C}$ .

Figure S2 Raman spectra of products formed at different temperatures at  $M_{\text{KMnO}_4}/M_{\text{F-DWCNTs}} = 5$ . The spectra were normalized to the G band for showing the change of the D band with temperatures.

Table S1. Oxidation conditions for unzipping F-DWCNTs to GNRs at different amount of  $\text{KMnO}_4$  at  $60\text{ }^\circ\text{C}$  ( $M_{\text{H}_2\text{SO}_4}/M_{\text{KMnO}_4} = 1.5$ ).

Sample	$M_{\text{KMnO}_4}/M_{\text{F-DWCNTs}}$	$\text{H}_2\text{SO}_4$ (mg)	$\text{KMnO}_4$ (mg)
5	2	3.7	2.4
6	4	7.4	4.8
7	5	9.2	5.9
8	10	18.4	11.8
9	15	27.6	18.1
10	20	36.8	24.2
11	25	46.0	30.0
12	20	2100.0	24.5

Table S2. Oxidation conditions for unzipping F-DWCNTs to GNRs at different temperatures at  $M_{\text{KMnO}_4}/M_{\text{F-DWCNTs}} = 5$ ,  $M_{\text{H}_2\text{SO}_4}/M_{\text{KMnO}_4} = 1.5$ .

Sample	T ( $^\circ\text{C}$ )	F-DWCNTs (mg)	$\text{H}_2\text{SO}_4$ (mg)	$\text{KMnO}_4$ (mg)
1	20	1.22	9.2	6.2
2	40	1.22	9.2	6.4
3	60	1.22	9.2	5.9
4	80	1.28	9.2	6.0

Table S3 Data of Raman spectra for the products formed at different temperatures.

Sample	$M_{\text{KMnO}_4}/M_{\text{F-DWCNTs}}$	$I_{\text{D/G}}$	Band Position ( $\text{cm}^{-1}$ )			FWHM ( $\text{cm}^{-1}$ )		
			G	D	2D	G	D	2D
F-DWCNTs	—	0.84	1574	1342	2676	18.0	21.4	32.2
20	5	0.78	1572	1341	2665	28.5	29.7	33.5
40	5	0.96	1574	1341	2670	31.0	31.4	36.4
60	5	1.28	1573	1343	2670	36.0	39.8	37.2
80	5	1.39	1572	1347	2682	40.5	48.4	37.9

Figure S1

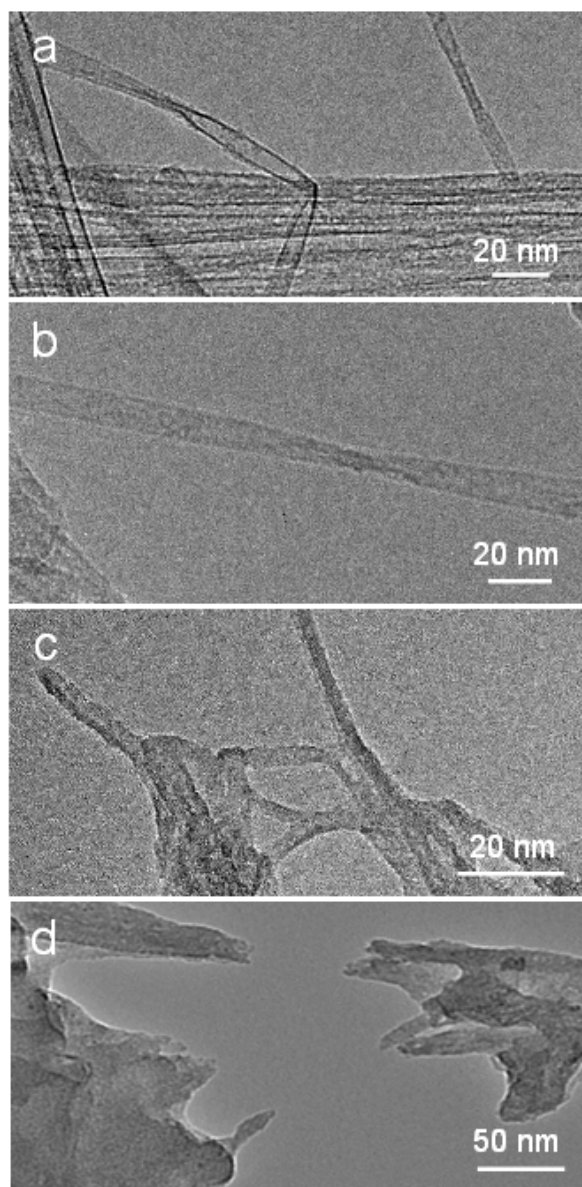


Figure S1 TEM images of products formed at  $M_{\text{KMnO}_4}/M_{\text{F-DWCNTs}} = 2, 4, 10$  and 15 (a-d) at 60 °C.

Figure S2

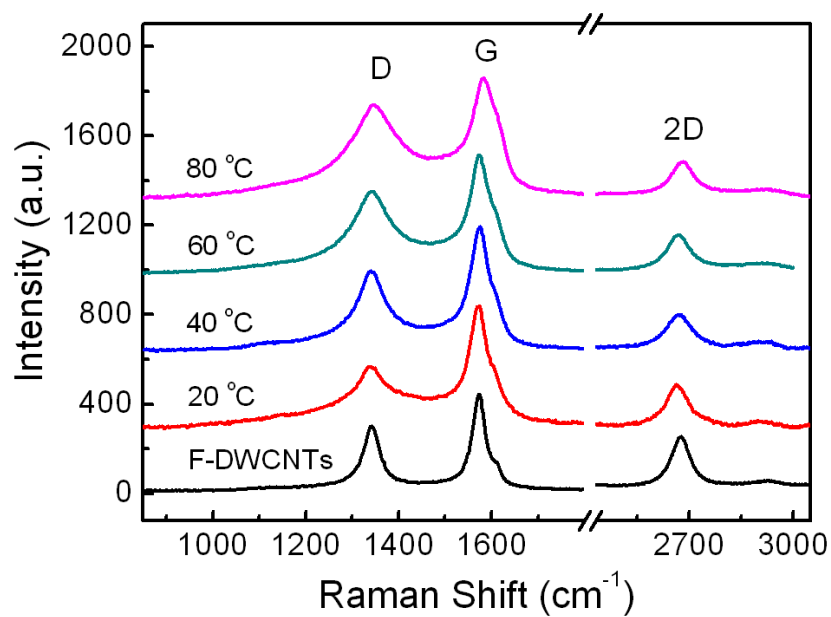


Figure S2 Raman spectra of products formed at different temperatures at  $M_{\text{KMnO}_4}/M_{\text{F-DWCNTs}} = 5$ . The spectra were normalized to the G band for showing the change of the D band with temperatures.