Electronic Supplementary Material (ESI) for Nanoscale.

Supporting information

Calculation of the yield of c-SWCNTs: (Lc×Dc)/ (Lo×Do)

Where, Lc is the average length of c-SWCNTs measured by AFM

Dc: average areal density of c-SWCNTs measured by AFM

Lo: average length of original SWCNTs measured by AFM

Do: average areal density of original SWCNTs measured by AFM

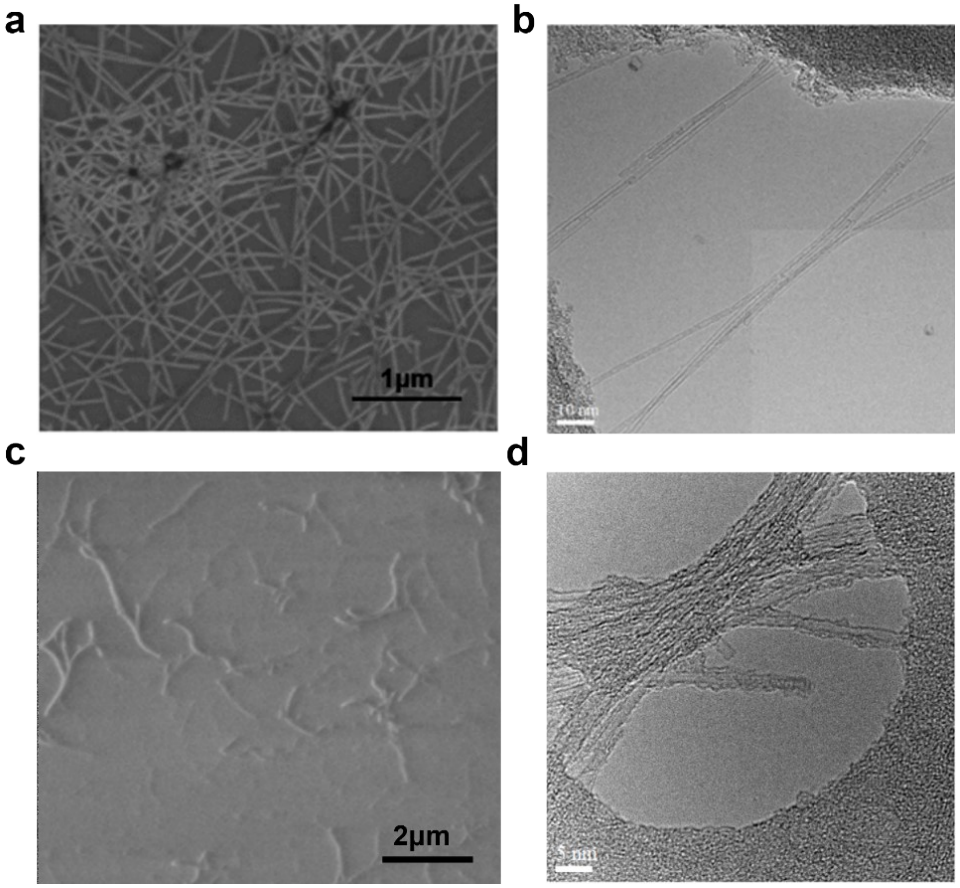

Fig. S1 Morphologies of (a-b) original, and (c-d) short c-SWCNTs.

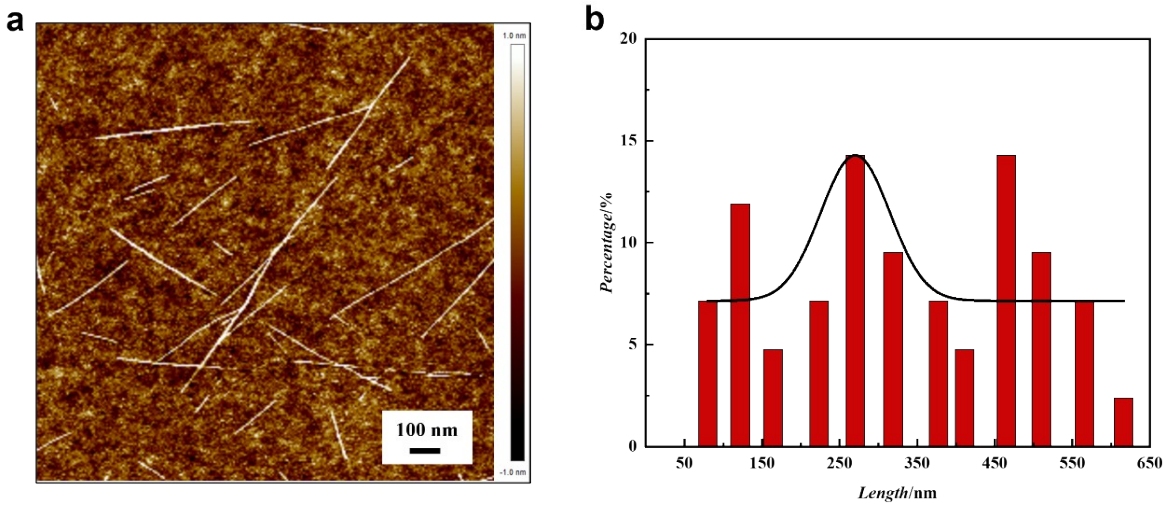

Fig. S2 Morphologies of short c-SWCNTs without defect introduction.

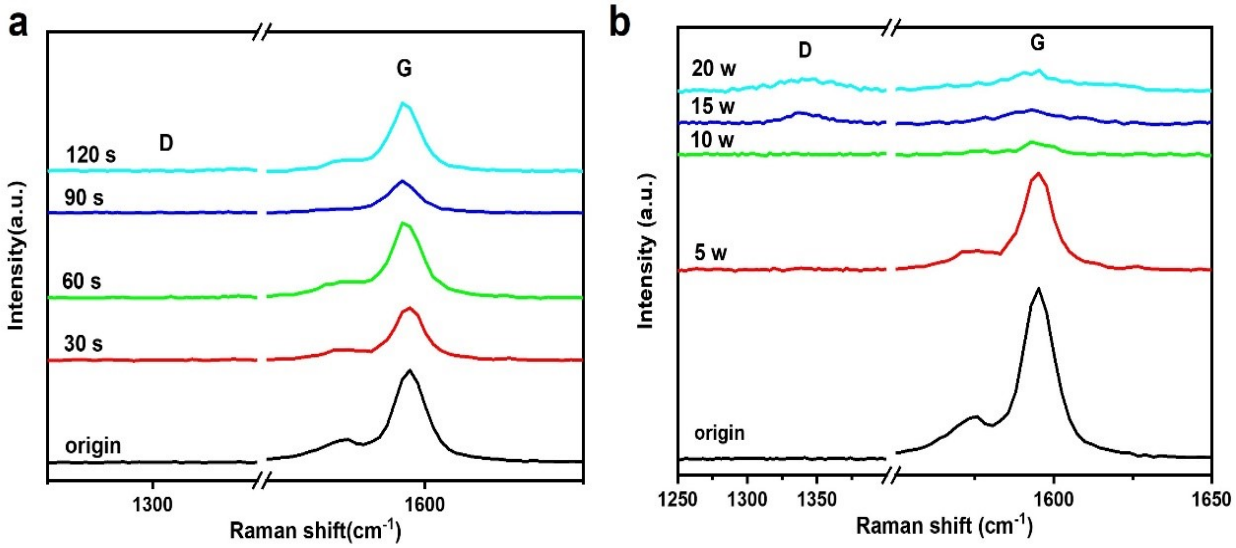

Fig. 3. G and D-mode Raman spectra of SWCNTs treated by H_2 plasma with different powers and time.

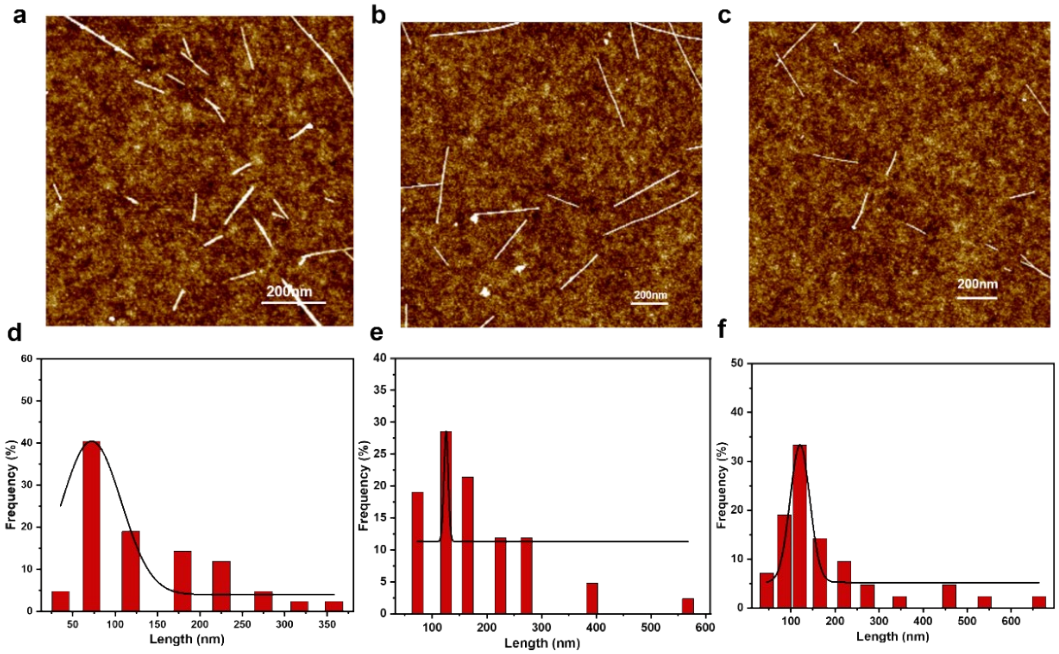

Fig. 4. AFM images of c-SWCNTs experienced H_2 plasma with powers of (a) 10 W, (b) 15 W, and (c) 20 W. (d), (e), and (f) show the length distribution of the SWCNTs based on AFM observations. The mean lengths of the c-SWCNTs shown in (a), (b), and (c) are 75 nm, 125 nm, and 120 nm, respectively.

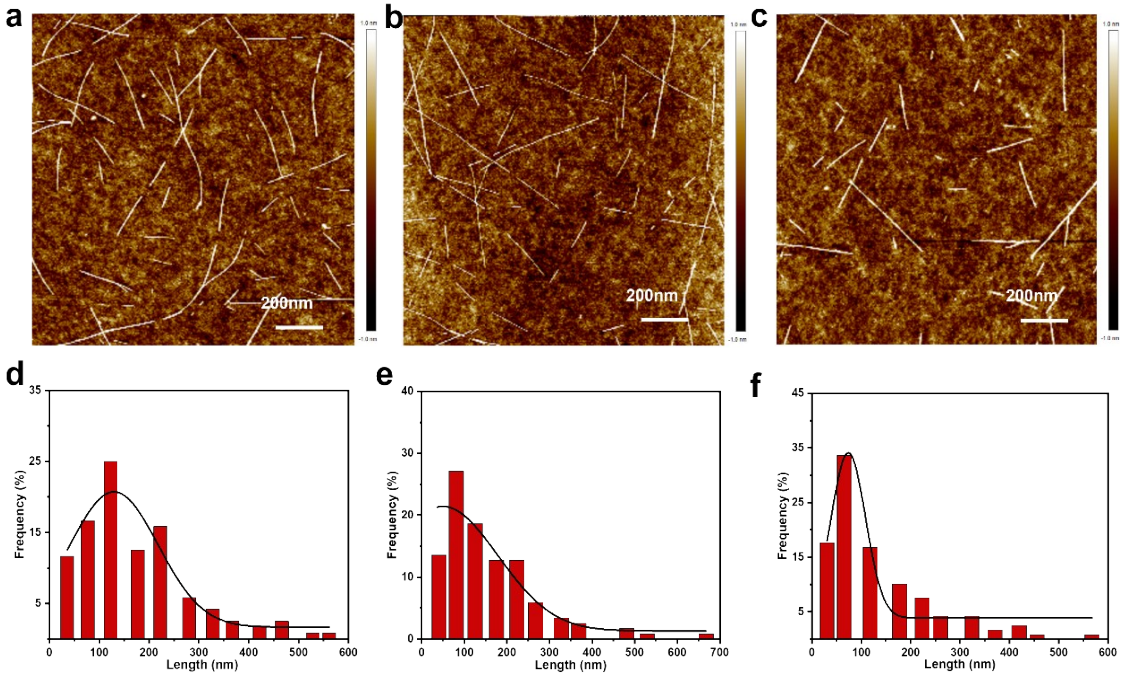

Fig. 5. AFM images (a-c) and length distributions (d-f) of the short-cut SWCNTs obtained by H_2O etching reaction at (a, d) 750 ℃, (b, e) 765 ℃, and (c, f) 780 ℃.

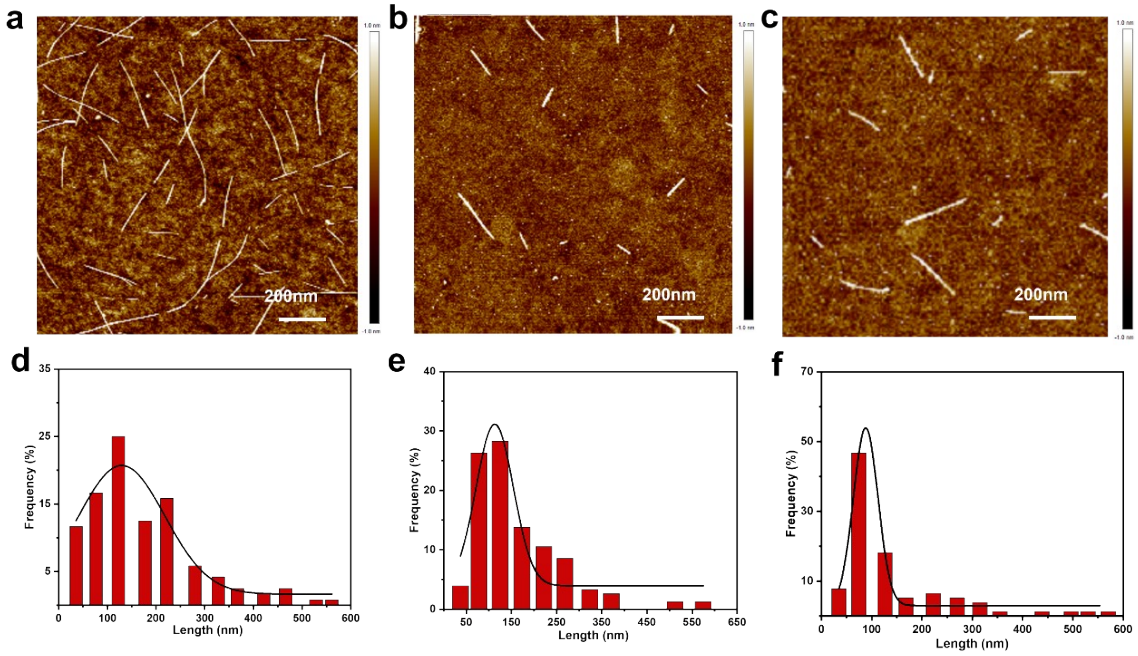

Fig. 6. AFM images (a-c) and length distributions (d-f) of the short-cut SWCNTs obtained by H_2O etching reaction with H_2O concentrations of (a, d) 1000 ppm, (b, e) 1500 ppm, (c, f) 2000 ppm.

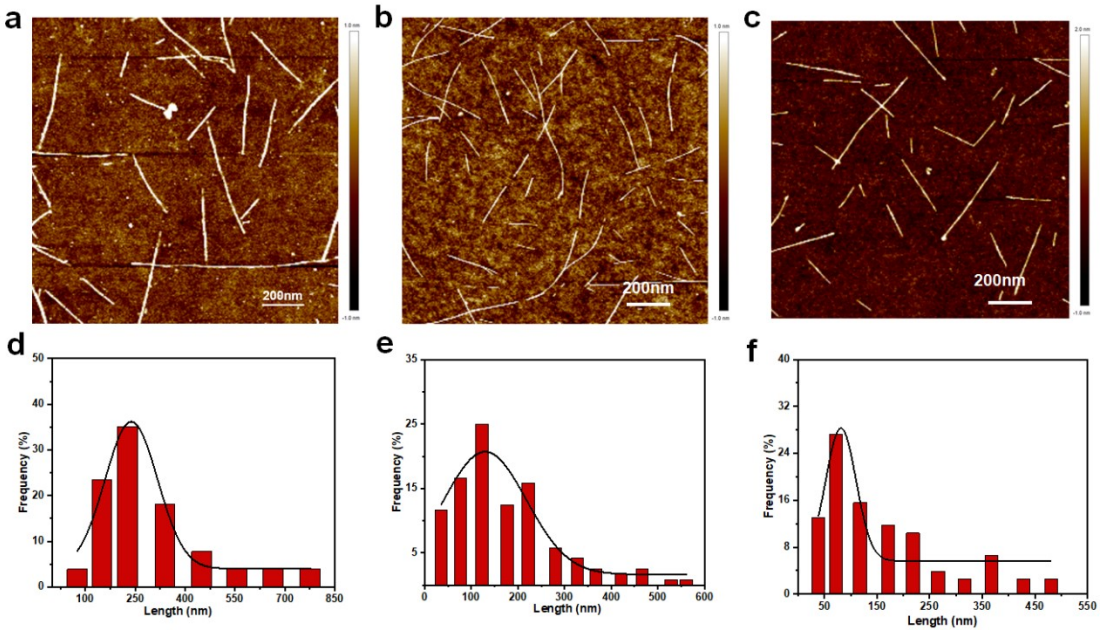

Fig. 7 AFM images of cut SWCNTs obtained using identical etching conditions except for the reaction time: (a, d) 4 min, (b, e) 5 min, (c, f) 6 min.. (d), (e), and (f) show the length distribution of the SWCNTs based on the measurement of AFM images.

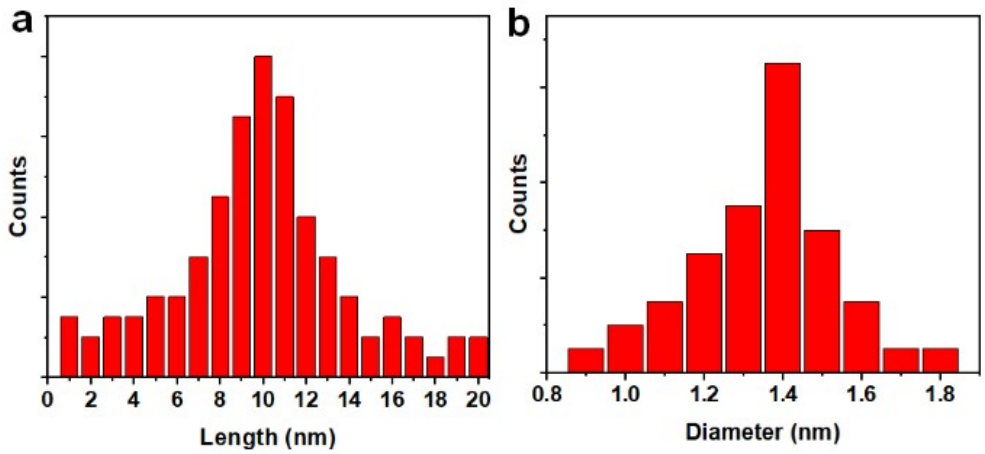

Fig. 8 Histograms of length and diameter of WO_3 nanowires filled in SWCNT based on the measurement of TEM images. (a) Length and (b) diameter distribution of WO_3 nanowires.