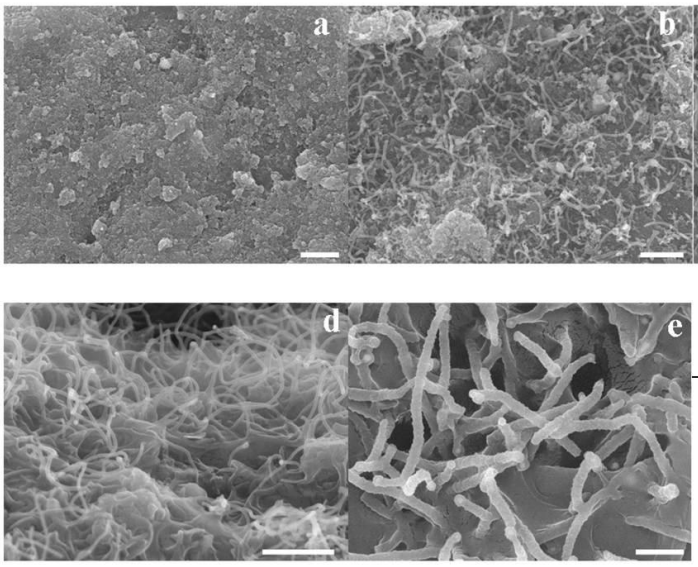
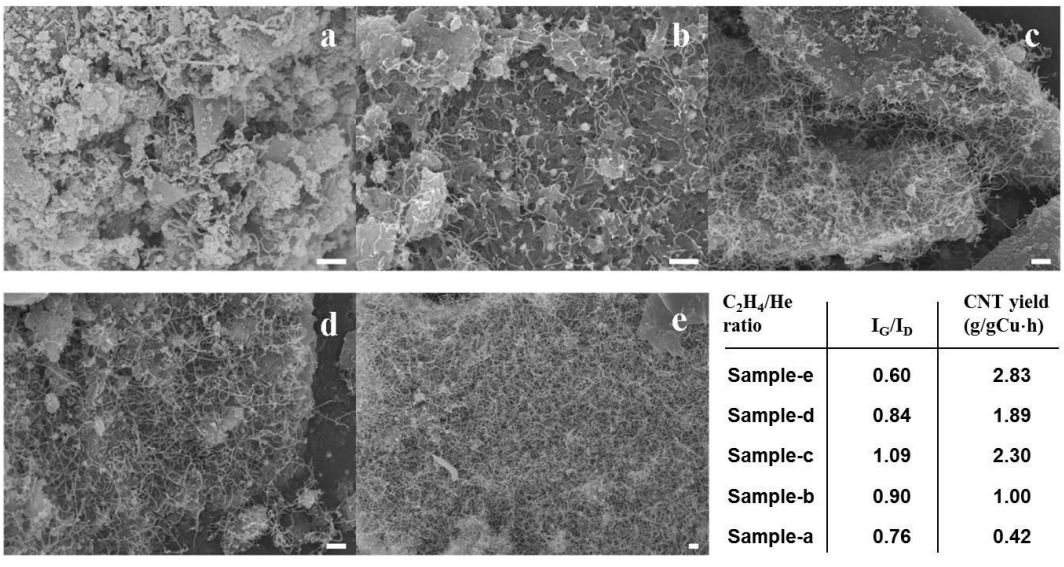
Electronic Supplementary Information



Synthesis Temp. (°C)	I_G/I_D	CNT yield (g/gCu·h)
900	0.94	10.51
850	1.06	8.99
800	1.09	2.30
750	0.76	1.51
700	–	0

Fig. S1 SEM images of the as-grown CNTs over 10.36 wt% $CuSO_4/\gamma$-Al_2O_3 catalyst with varying reaction temperatures for 30 min. (a) 700 °C, (b) 750 °C, (c) 800 °C, (d) 850 °C and (e) 900 °C. The table displays the I_G/I_D raitos and the growth yileds of the as-grown CNTs with different temperatures. The total flow rate is 100 mL/min. The scale bar in (a)-(e) is 1 μm.



C_2H_4/He ratio	I_G/I_D	CNT yield (g/gCu·h)
Sample-e	0.60	2.83
Sample-d	0.84	1.89
Sample-c	1.09	2.30
Sample-b	0.90	1.00
Sample-a	0.76	0.42

Fig. S2 SEM images of the as-grown CNTs over 10.36 wt% $CuSO_4/\gamma$-Al_2O_3 catalyst with varying diluted ratios of carbon source at 800 °C for 30 min. (a) C_2H_4/He=1/3, (b) C_2H_4/He=1/6, (c) C_2H_4/He=1/9, (d) C_2H_4/He=1/12 and (e) C_2H_4/He=1/15. The total flow rate is 100 mL/min. The scale bar in (a)-(e) in 1 μm.

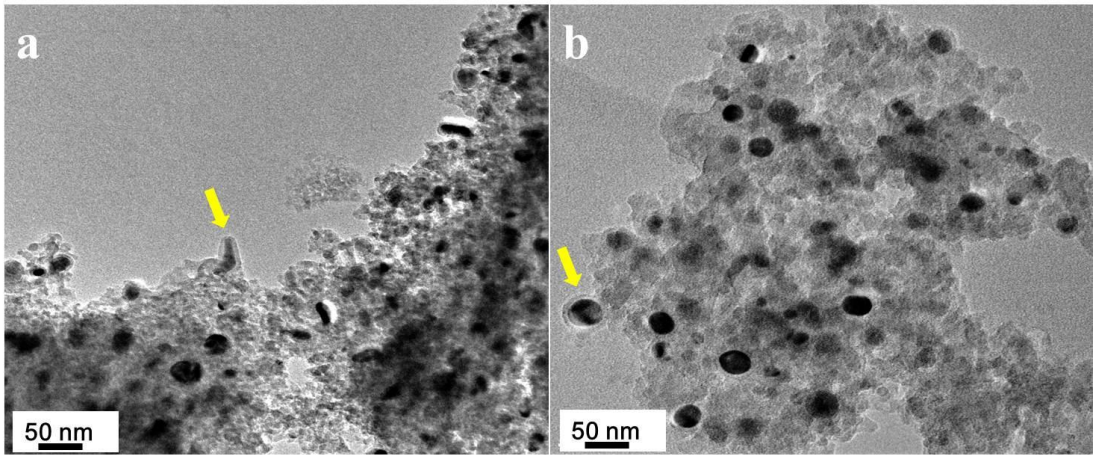


Fig. S3 TEM images of the amorphous carbons grown over (a) 10.25 wt% $Cu(CH_3COO)_2$/ γ-Al_2O_3 and (b) 9.99 wt% $Cu(NO_3)_2$/γ-Al_2O_3 catalysts at 800 ^oC for 30 min with a helium dilute ethylene (C_2H_4/He=1/9 = 100 mL/min).

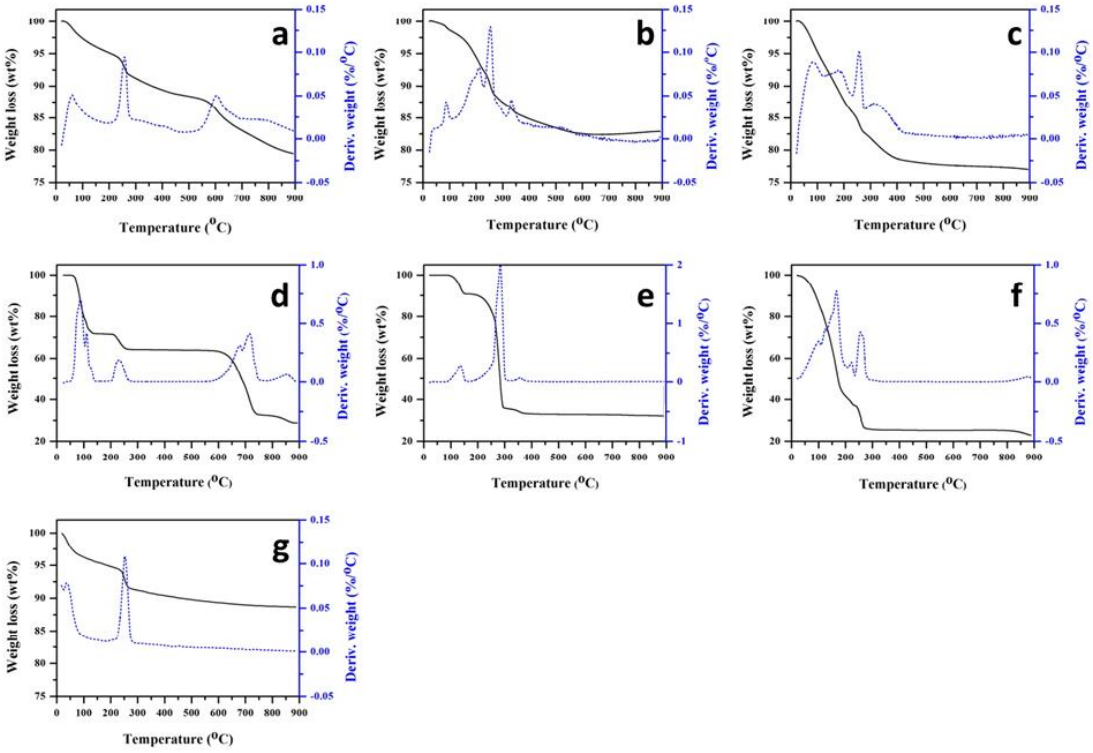


Fig. S4 Thermal decomposition curves of (a) $CuSO_4$/γ-Al_2O_3, (b) $Cu(CH_3COO)_2$/γ-Al_2O_3, (c) $Cu(NO_3)_2$/γ-Al_2O_3, (d) $CuSO_4 \cdot 5H_2O$, (e) $Cu(CH_3COO)_2 \cdot H_2O$, (f) $Cu(NO_3)_2 \cdot 3H_2O$ and (g) γ-Al_2O_3 using TGA analysis in helium with a flow of 40 mL/min. The Cu contents of (a), (b), (c) are 10.36, 10.25 and 9.99 wt% respectively and determined by ICP-MS.