Facile Synthesis of Metal Nanoparticles Decorated Magnetic Hierarchical Carbon Microtubes with Polydopamine-Derived Carbon Layer for Catalytic Applications

Teng Miao[a‡], Jing Zheng[a‡*], Jianping Wang[a], Jingli Xu[a], Njud S. Alharbi[b], Min Zhang[a*].

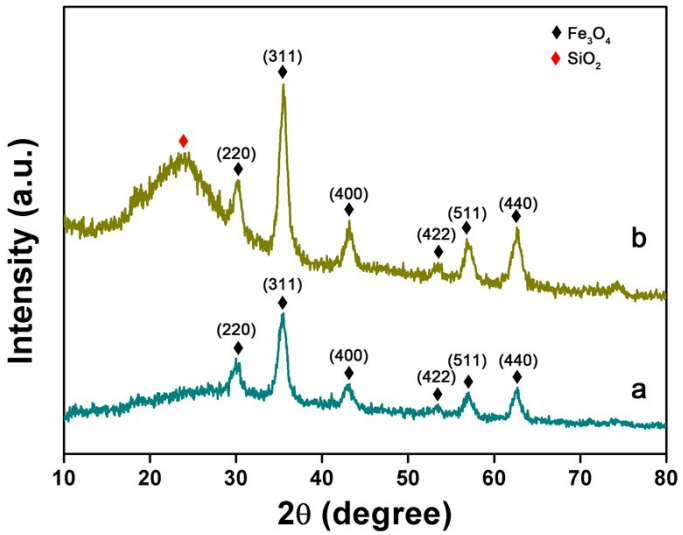

Fig.S1 XRD patterns of NCMTs@Fe_3O_4 (a) and NCMTs@Fe_3O_4@SiO_2 (b).

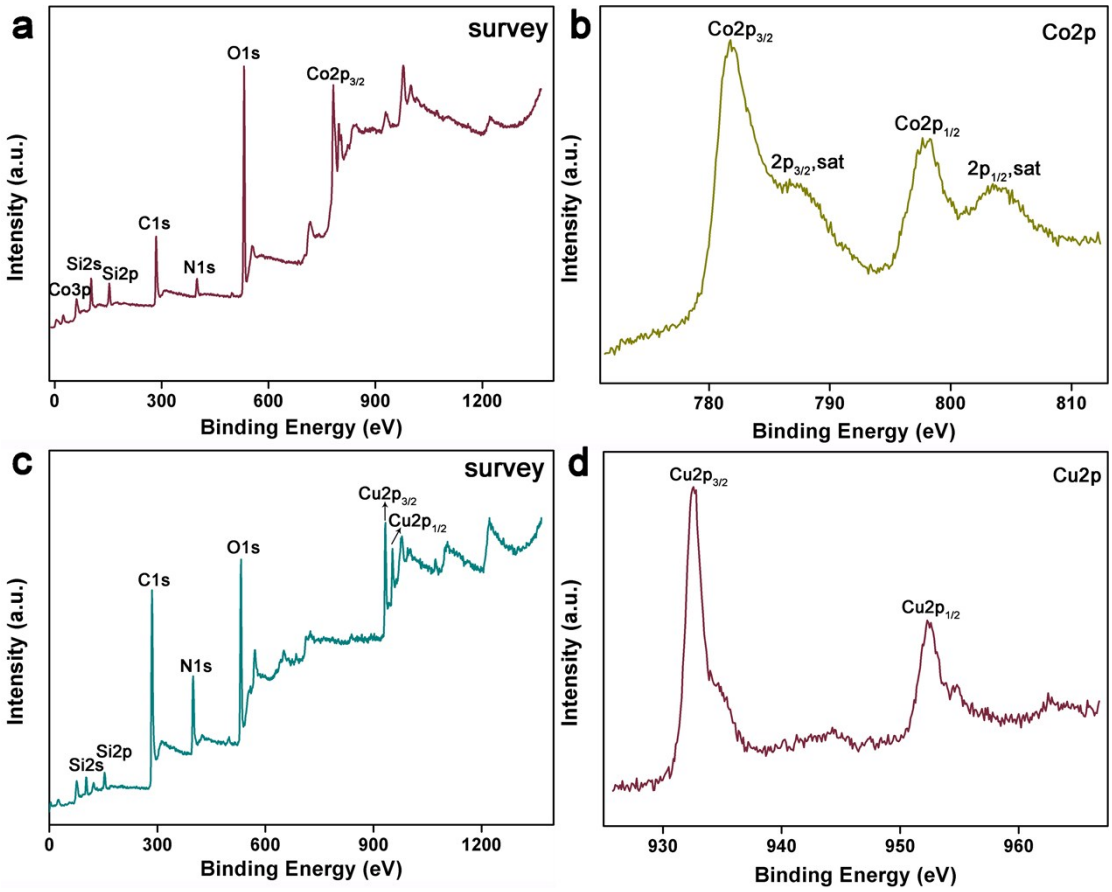

Fig. S2 XPS spectra of the NCMTs@Fe_3O_4@SiO_2@C/Co and NCMTs@Fe_3O_4@SiO_2@C/Cu. (a) survey spectrum of NCMTs@Fe_3O_4@SiO_2@C/Co, (b) Co2p spectrum, (c) survey spectrum of

NCMTs@Fe_3O_4@SiO_2@C/Co, (d) Cu2p spectrum.

Table S1. Metal atomic ratios and binding energies in NCMTs@Fe_3O_4@SiO_2@C/Ni, NCMTs@Fe_3O_4@SiO_2@C/Co, NCMTs@Fe_3O_4@SiO_2@C/Cu, respectively.

Name	Ni2p	Co2p	Cu2p
Peak BE	856.45 eV	781.91 eV	932.55 eV
Atomic %	5.95 %	10.16 %	3.02 %

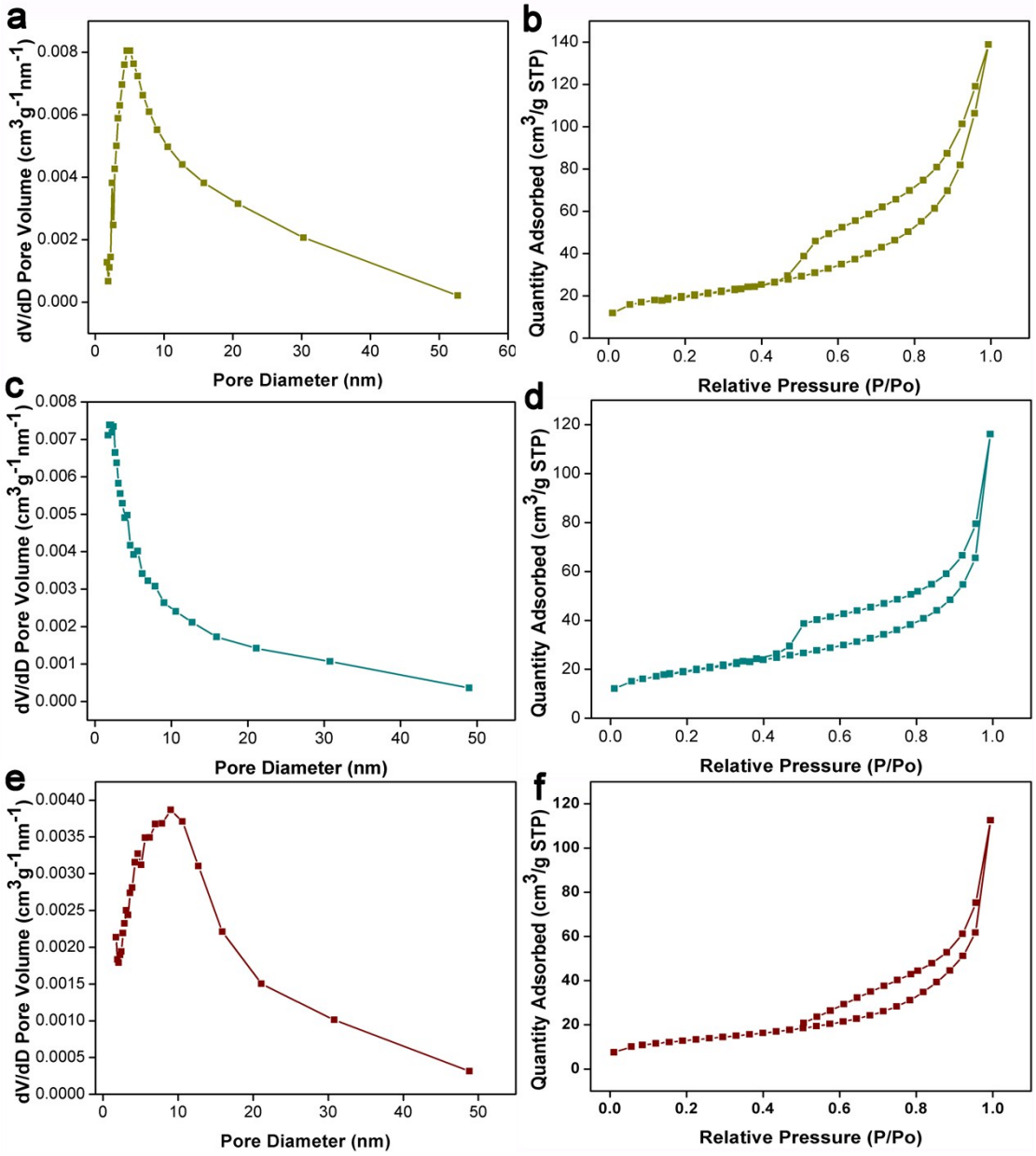

Fig. S3 The pore size distribution curves and nitrogen adsorption-desorption isotherms of NCMTs@Fe_3O_4@SiO_2@C/Ni (a, b), NCMTs@Fe_3O_4@SiO_2@C/Co(c,d), NCMTs@Fe_3O_4@SiO_2@C/Cu (e,f).

Table S2. Surface Area, Pore Volume and Pore Size of NCMTs@Fe_3O_4@SiO_2@C/Ni, NCMTs@Fe_3O_4@SiO_2@C/Co, NCMTs@Fe_3O_4@SiO_2@C/Cu composite.

Materials	Surface Area	Pore Volume	Pore Size
NCMTs@Fe_3O_4@SiO_2@C/Ni	69.27 m^2/g	0.15 cm^3/g	8.91 nm
NCMTs@Fe_3O_4@SiO_2@C/Co	66.62 m^2/g	0.09 cm^3/g	5.64 nm
NCMTs@Fe_3O_4@SiO_2@C/Cu	45.01 m^2/g	0.088 cm^3/g	7.80 nm

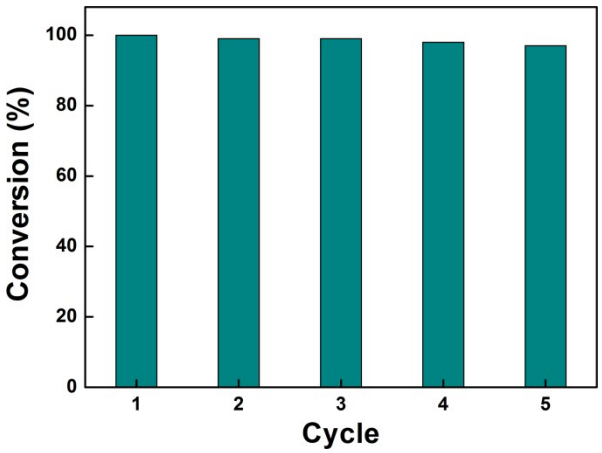

Fig. S4 the recyclability of NCMTs@Fe_3O_4@SiO_2@C/Ni as the catalyst for 4-NP.

Table S3. Comparison of the activity parameter κ of metal catalysts for the reduction of 4-NP

Samples	k($\times10^{-3}s^{-1}$)	κ($\times10^{-3}$ $mg^{-1}s^{-1}$)	References
NCMTS@Fe_3O_4@SiO_2@C/Ni	3.43	545.3	This work
Ni/MC-750	6.26	20.9	[1]
C-Ni/500	21.7	523	[2]
Ni/C-800	17.41	0.0174	[3]
Fe@Au-ATPGO	1.4	400	[4]
Fe_3O_4@SiO_2-Au@mSiO_2	7	105	[5]
Ni/SNTs(23.0 wt%)	84	91	[6]
TiO_2@C-Ni/700	15.17	173.21	[7]

References

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