Nanoporous carbonaceous materials with high surface area: synthesis and application in catalysis

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Tables and Figures

Table S1 Elemental analysis for the monomers and the corresponding polymers (wt%)

	C	H	O
BHMB	78.50	6.54	14.96
HCP-BHMB	84.23	4.32	7.91

Table S2 Pore parameters of HCP-BHMB, HCP-BHMB-K-800 and the nanocatalysts.

Samples	$S_{BET}{}^{a}$ (m^2 g^{-1})	$V_{Total}{}^{b}$ (cm^3 g^{-1})	$V_{Micro}{}^{c}$ (cm^3 g^{-1})	Dominant pore size^{d} (nm)
HCP-BHMB	1249	0.94	0.55	0.62, 2.31
HCP-BHMB-K-800	3142	2.19	1.89	0.58, 2.12
Ag@HCP-BHMB	1109	0.78	0.49	0.53, 2.15
Ag@HCP-BHMB-K-800	2733	1.88	1.59	0.55, 2.30

^{a} Surface area was calculated from the nitrogen adsorption branch according to the BET model.
^{b} The total pore volume was calculated from the single point nitrogen uptake at $P/P_0 = 0.99$.
^{c} The micropore volume was estimated by the t-plot method.
^{d} Pore size derived from N_2 isotherm with the NLDFT approach.

Table S3 Comparison of catalytic activity of different catalysts for the reduction of 4-NP. (some TOF values are calculated based on the experimental conditions listed in the reference)

Name of Catalyst	Metal	Time (min)	k (min^{-1})	TOF ($mol\ g^{-1}\ s^{-1}$)	Ref.
Ag@HCP-BHMB-K-800	Ag	2.5	1.26	2.67×10^{-5}	This work
Ag@HCP-BHMB	Ag	10	3.1×10^{-1}	6.67×10^{-6}	This work
Ag@NC(1.0 mg)	Ag	14	4.2×10^{-3}	2.38×10^{-6}	[1]
Ag/C@mSiO_2-S	Ag	7	4.5×10^{-1}	1.43×10^{-6}	[2]
1.0Ag/p-BNNS-Air	Ag	0.75	9.01	1.33×10^{-5}	[3]
silica-Ag2	Ag	8	5.10×10^{-1}	4.17×10^{-7}	[4]
Ag-COP(1:1)	Ag	5	7.32×10^{-1}	3.33×10^{-7}	[5]
Ag@CCTPB-K	Ag	3.5	8.7×10^{-1}	1.90×10^{-5}	[6]
Ag@γ-Fe_2O_3/t-ZrO_2	Ag	1.5	2.80	3.33×10^{-6}	[7]
PMPA-1	Ag	6	5.7×10^{-1}	5.56×10^{-7}	[8]
Au/TNT	Au	60	6.1×10^{-2}	3.52×10^{-6}	[9]
Au@NH2-MSNs	Au	8	3.7×10^{-1}	1.04×10^{-5}	[10]
Au-Ce-MOF	Au	10	3.24×10^{-1}	1.67×10^{-6}	[11]
CG-Ag_2O/Au-SiO_2	Au	7	4.89×10^{-1}	1.19×10^{-5}	[12]
PCNFs-Au	Au	0.83	6.27	1.5×10^{-5}	[13]
NH_2-MIL-88B(Fe)@Au@COFs	Au	25	1.31×10^{-1}	16×10^{-5}	[14]
Pd/HKUST-1(Pd-14.4)	Pd	3	9.84×10^{-1}	4.17×10^{-6}	[15]
Pd/PC-POP(3.7% Pd)	Pd	5.95	5.64×10^{-1}	1.51×10^{-5}	[16]
Co/PCNS	Co	7	3.15×10^{-1}	6.85×10^{-6}	[17]
CoPOP-2	Co	15	6.9×10^{-2}	1.56×10^{-6}	[18]
Co-Fe_3O_4@C-A	Co	1.3	2.10	3.75×10^{-5}	[19]

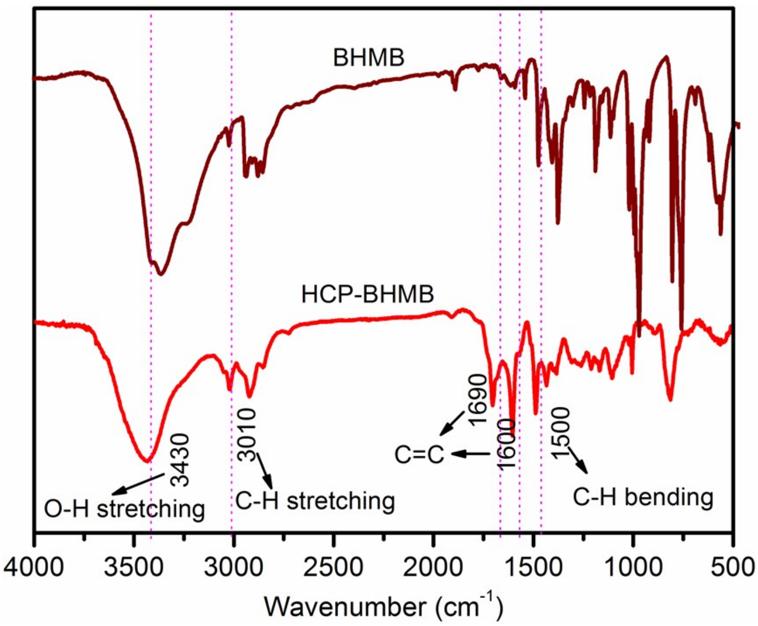

Fig. S1 Comparison of the FTIR spectra of BHMB and HCP-BHMB.

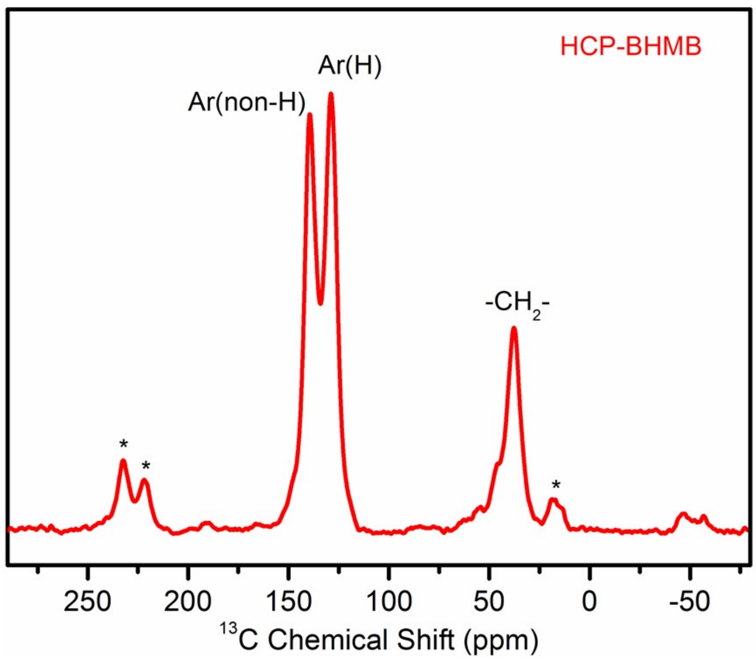

Fig. S2 ^{13}C CP/MAS NMR spectrum of HCP-BHMB.

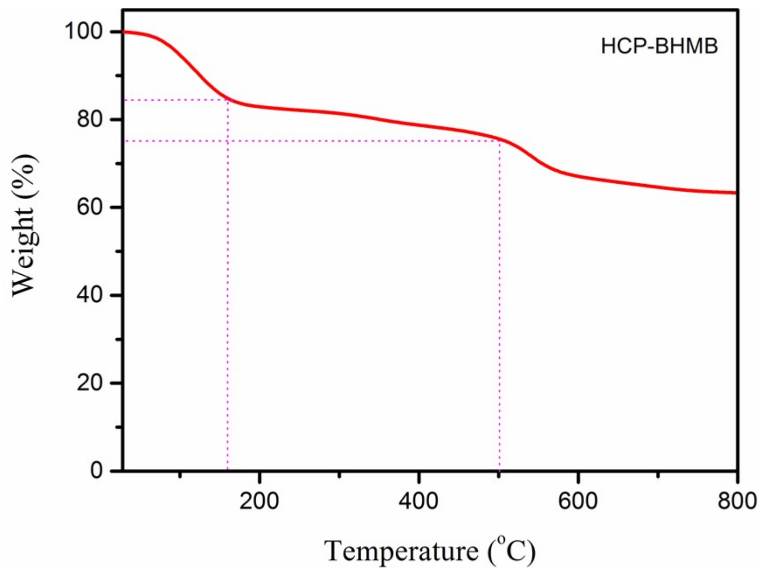

Fig. S3 TGA curve of HCP-BHMB at a ramp of 10 ^{o}C min^{-1} in nitrogen atmosphere.

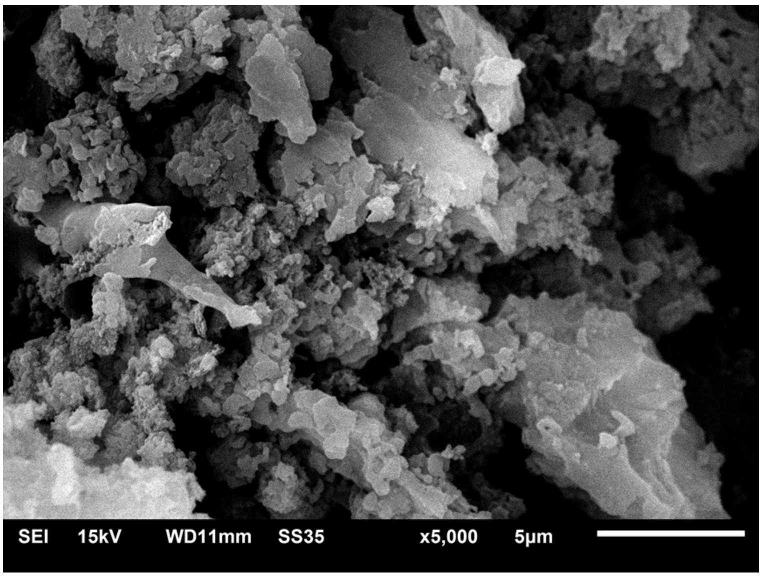

Fig. S4 SEM image of HCP-BHMB.

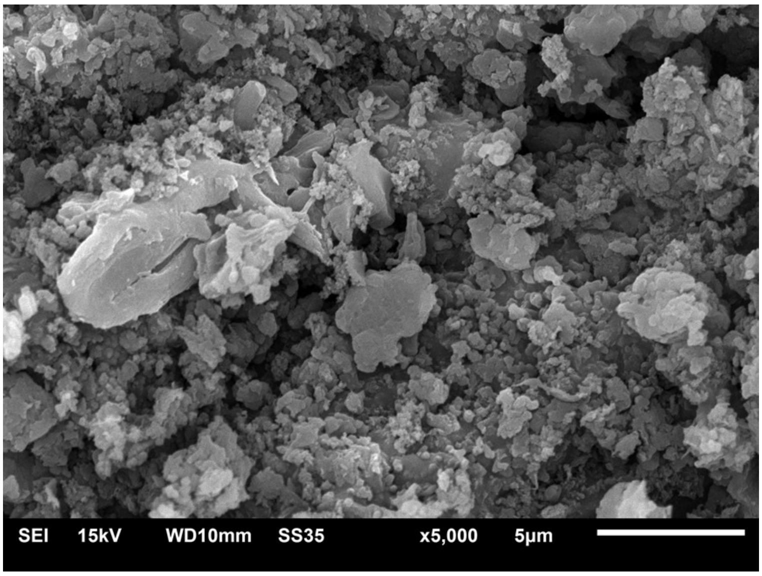

Fig. S5 SEM image of HCP-BHMB-K-800.

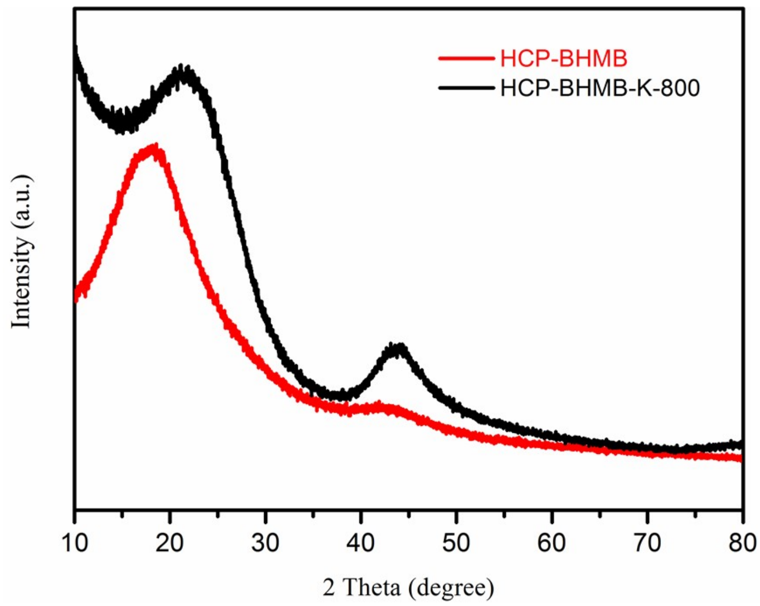

Fig. S6 Powder X-Ray diffraction (PXRD) of HCP-BHMB and HCP-BHMB-K-800.

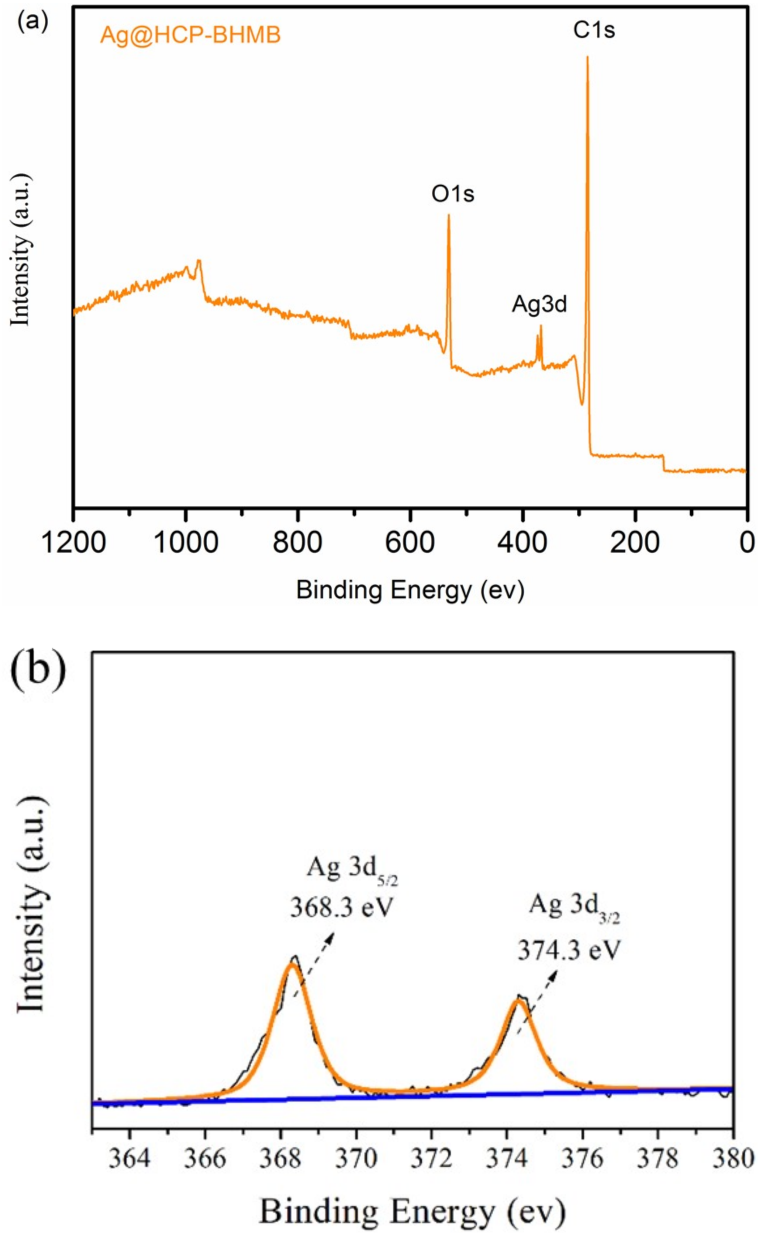

Fig. S7 XPS analysis of Ag@HCP-BHMB. (a) Survey scan of Ag@HCP-BHMB and (b) high-resolution Ag 3d XP spectra of Ag@HCP-BHMB.

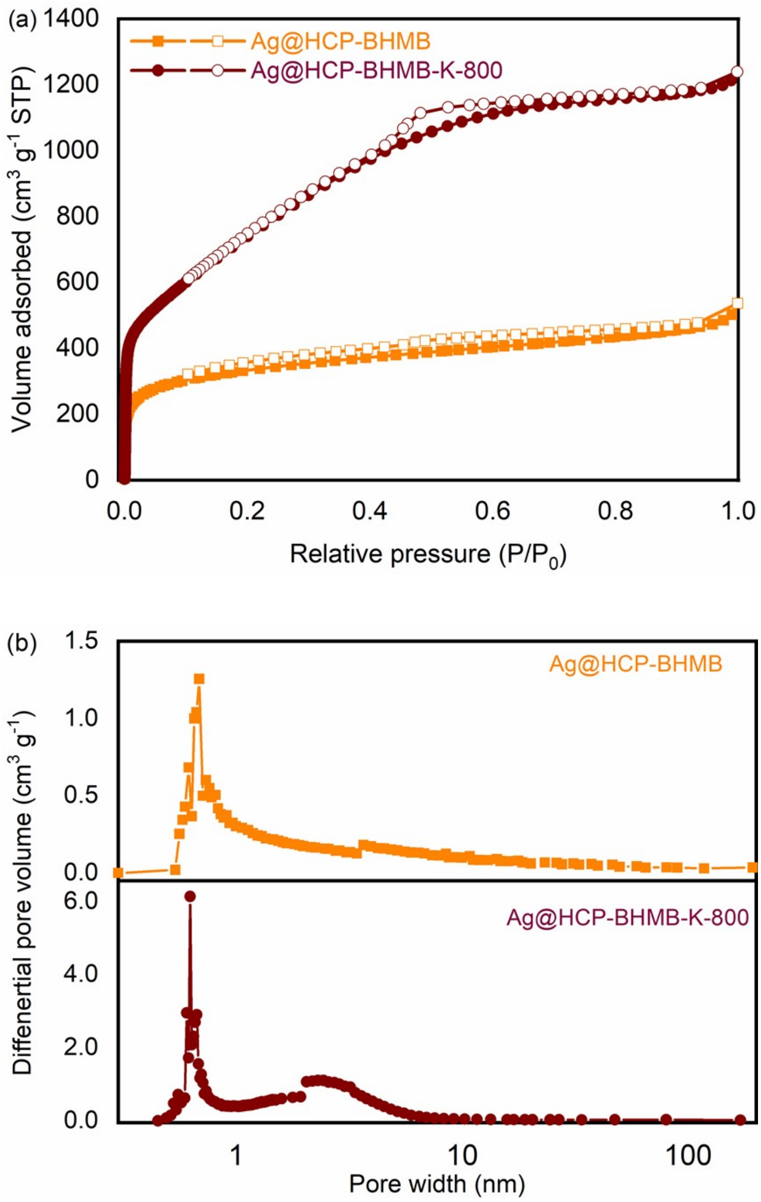

Fig. S8 (a) N_2 adsorption-desorption isotherms and (b) pore size distribution curves of Ag@HCP-BHMB and Ag@HCP-BHMB-K-800.

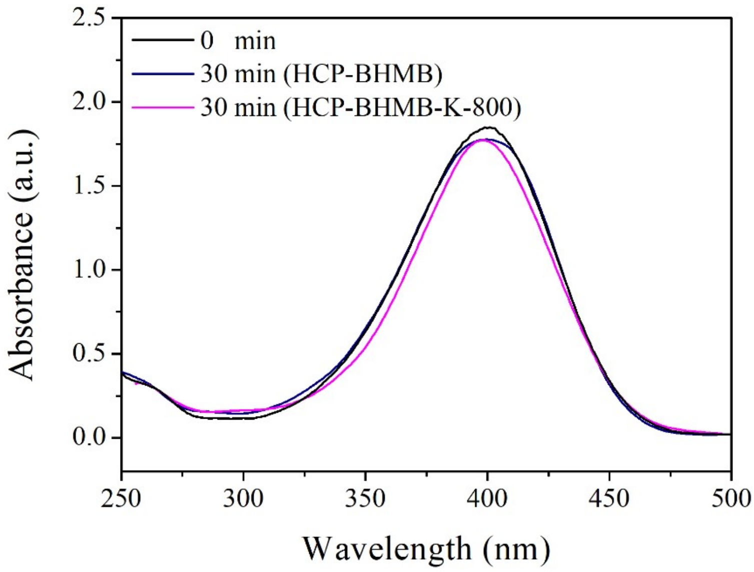

Fig. S9 Time-dependent UV-Vis absorption spectra for the reduction of 4-nitrophenol reduction with $NaBH_4$ in the presence of HCP-BHMB and HCP-BHMB-K-800.

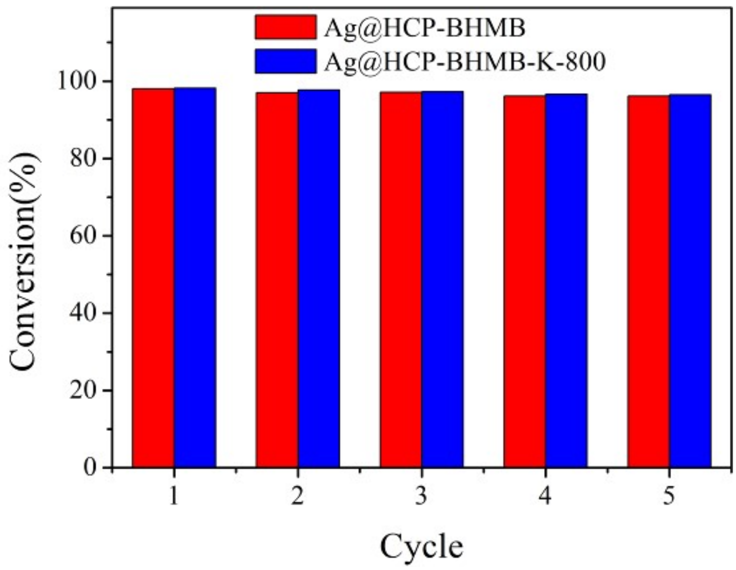

Fig. S10 Reusability of Ag@HCP-BHMB and Ag@HCP-BHMB-K-800 nanocatalysts for the reduction of 4-NP by $NaBH_4$.

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