Supporting Information

Hydrothermal carbon enriched with oxygenated groups from biomass glucose as efficient carbocatalyst

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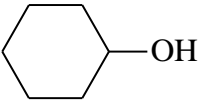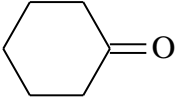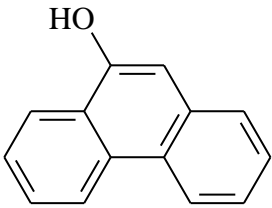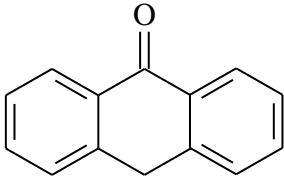

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Table S1. Textural properties of HTC and zeolite samples.

Sample	S_{BET} (m^2/g)	Smicro (m^2/g)	V_p^a (cm^3/g)	D_p^b (nm)
HTC-10G	6.5	0	0.01	5.5
HTC-5G	7.8	0	0.01	6.1
HTC-2.5G	17.0	0	0.03	6.6
HTC-10GPVA	19.8	0	0.03	5.4
HTC-10G1A	9.0	0	0.01	6.5
HTC-10G3.3A	5.5	0	0.01	6.4
HTC-10G10A	13.9	0	0.04	10.7
HTC-10G10A300	34.0	0	0.05	7.6
HTC-10G10A300m	151.6	118.0	0.10	7.6
HY	323.7	0	0.61	5.7
HZSM-5	368.4	225.1	0.20	3.9

[a] Pore volume measured at the single point of P/P_0 = 0.99.
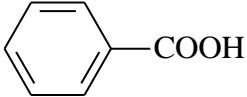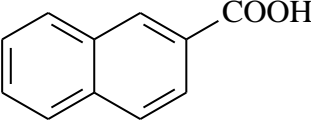
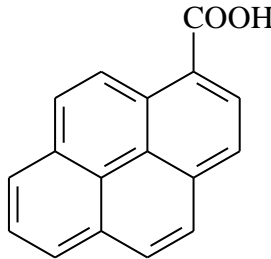[b] BJH desorption average pore diameter.

Table S2. Reduction of nitrobenzene using organic model molecules as catalysts.[a]

Model molecule	Conversion (%)	Aniline selectivity (%)
Blank[b]	23.2	79.8
	17.9	84.1
	20.7	66.6
	74.6	87.3
	33.8	80.2

[a] Reaction conditions: 0.3 mmol model molecules, 1.2 g nitrobenzene, 6.0 equivalent hydrazine monohydrate (3.4 g), 100 ℃, 4 h.

[b] Blank experiment was conducted in the absence of any model molecules.

Table S3. Beckmann rearrangement of cyclohexanone oxime using organic model molecules as catalysts.[a]

Model molecule	Conversion (%)	Lactam selectivity (%)	Cyclohexanone selectivity (%)
blank[b]	10.3	72.8	27.2
CH₃COOH	11.0	0	100
—COOH	32.4	82.4	17.6
COOH	14.1	0	100
COOH	14.4	0	100

[a] Reaction conditions: 115 mg cyclohexanone oxime, 10 mL solvent benzonitrile, 0.4 mmol model molecules, 130 ℃, 1.5 h.

[b] Blank experiment was conducted in the absence of any model molecules.
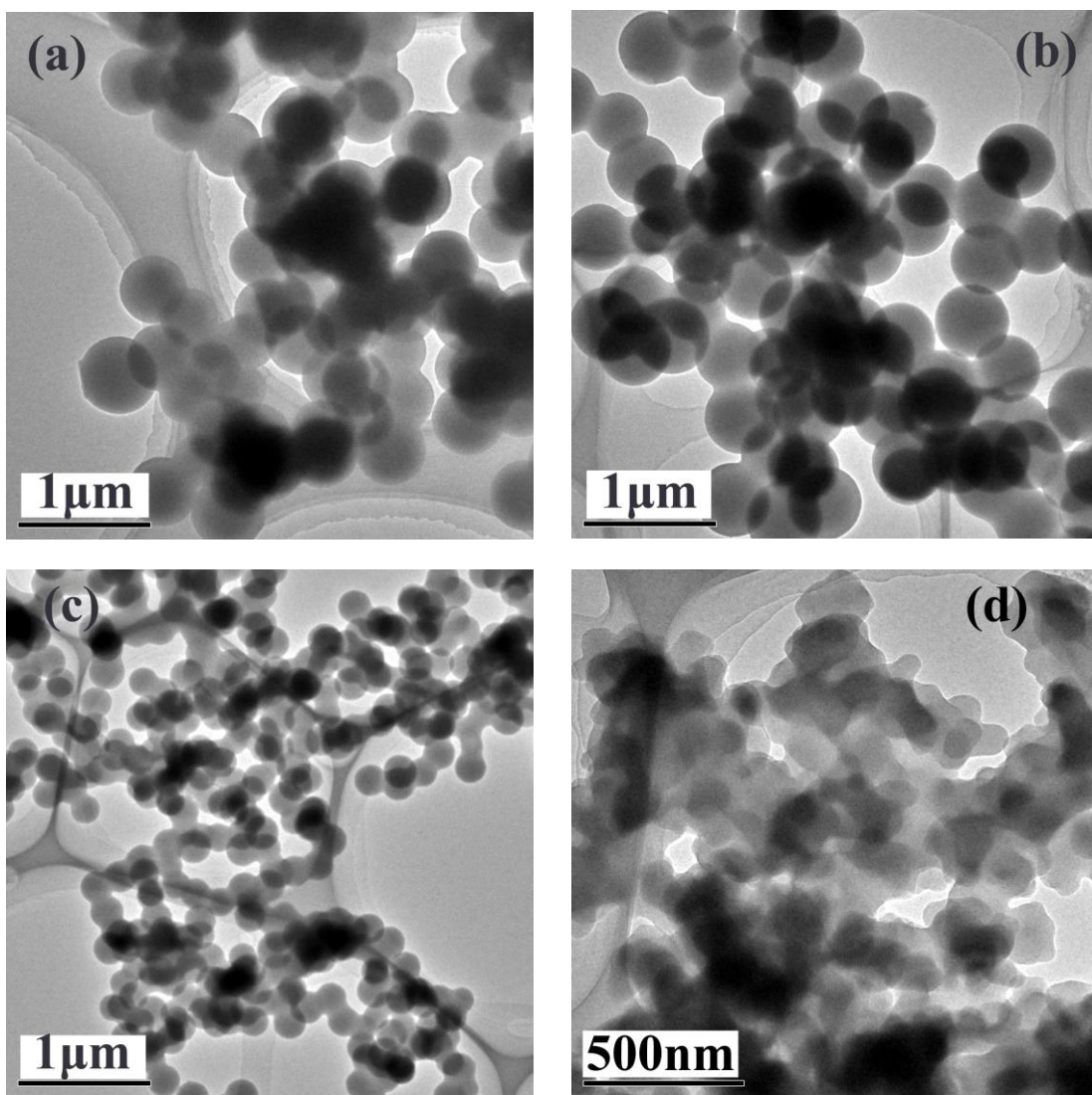
Figure S1. TEM images of HTC samples. (a) HTC-10G, (b) HTC-5G, (c) HTC-2.5G, (d) HTC-GPVA.
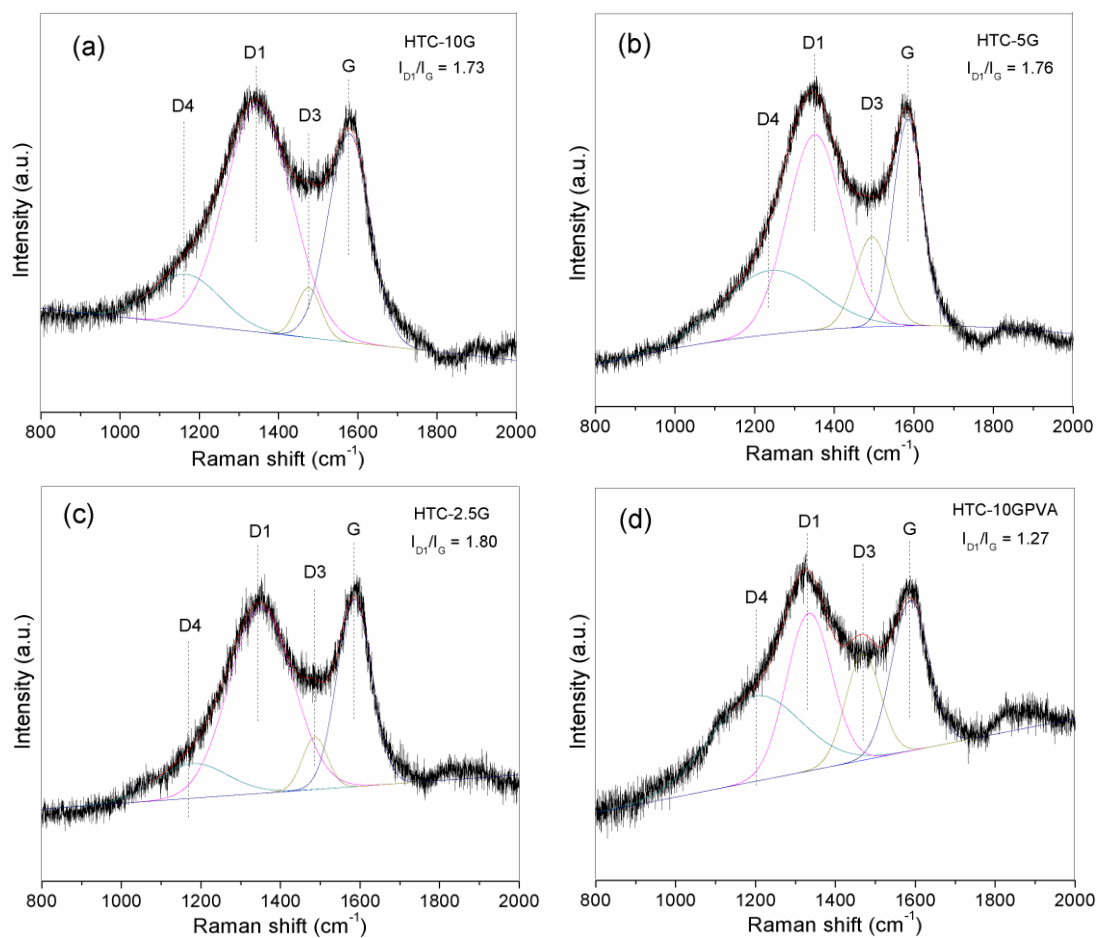
Figure S2. Raman spectra of HTC samples. (a) HTC-10G, (b) HTC-5G, (c) HTC-2.5G, (d) HTC-GPVA.
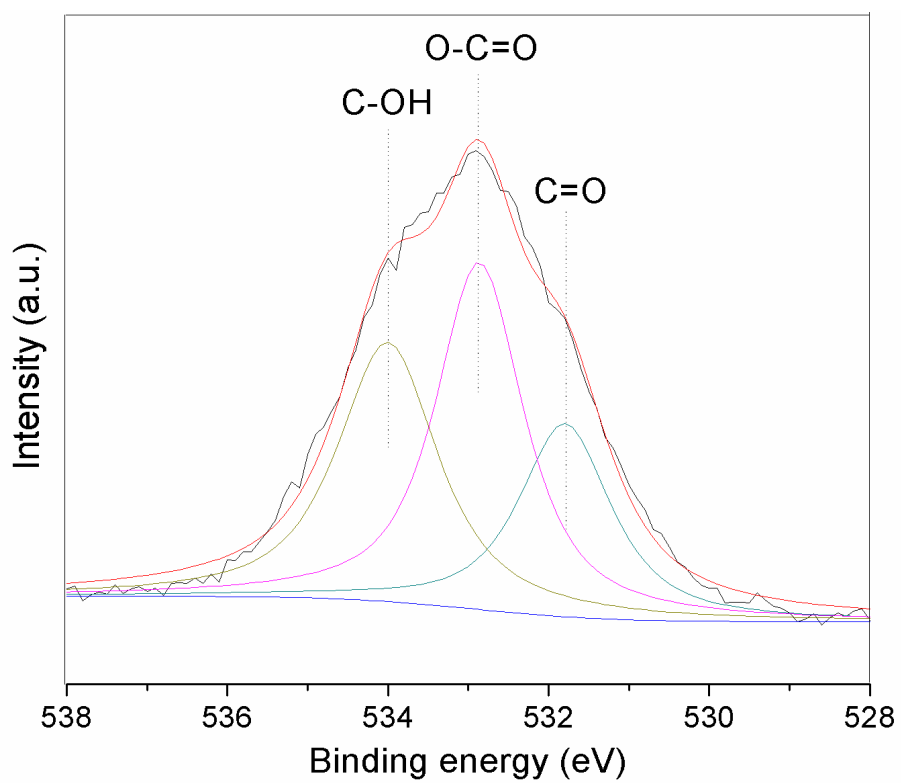
Figure S3. XPS spectra of HTC-10G (total surface O atom percentage is 13.0 at.%).
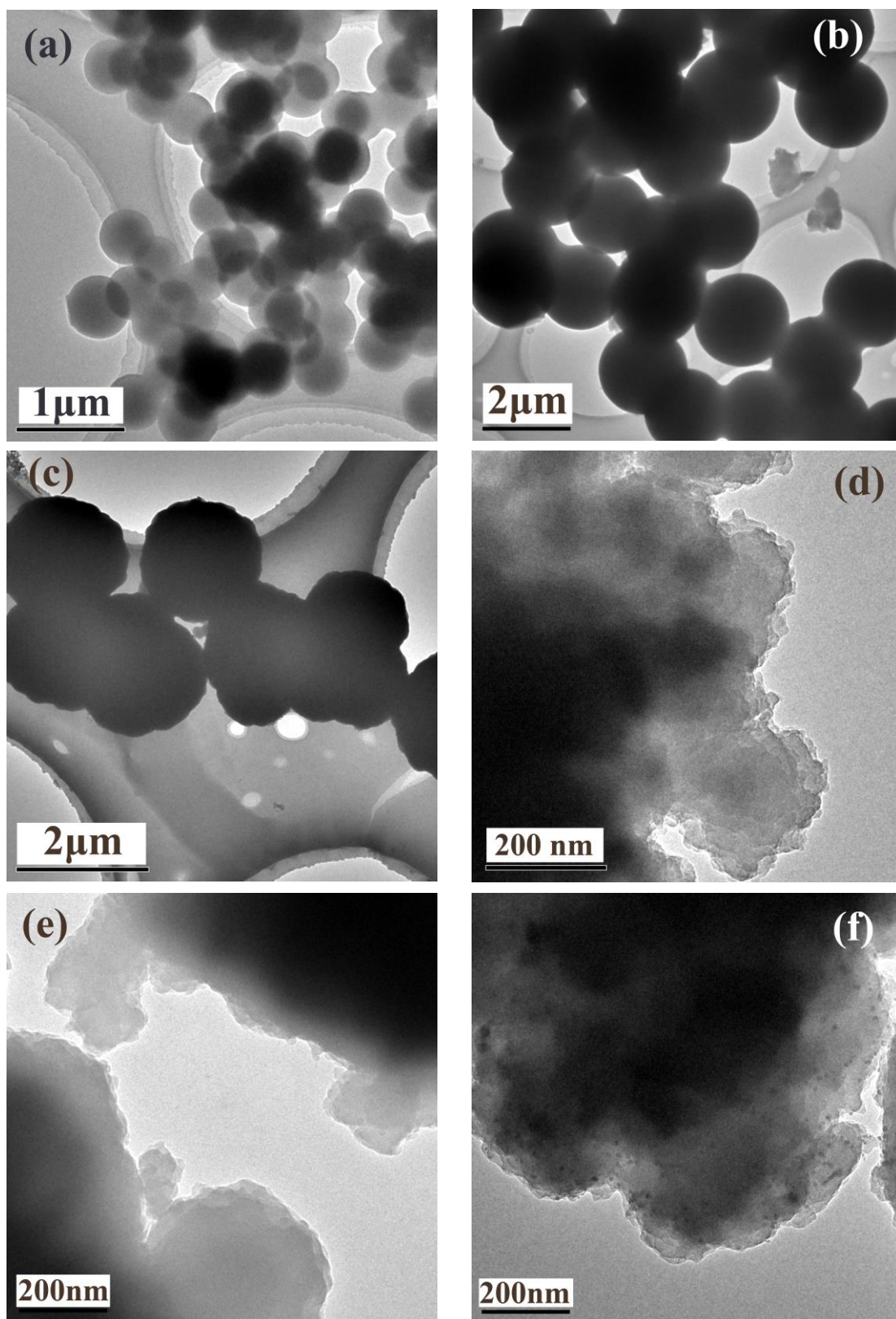
Figure S4. TEM images of HTC samples. (a) HTC-10G, (b) HTC-10G1A, (c) HTC-10G3.3A, (d) HTC-10G10A, (e) HTC-10G10A300, (f) HTC-10G10A300m.
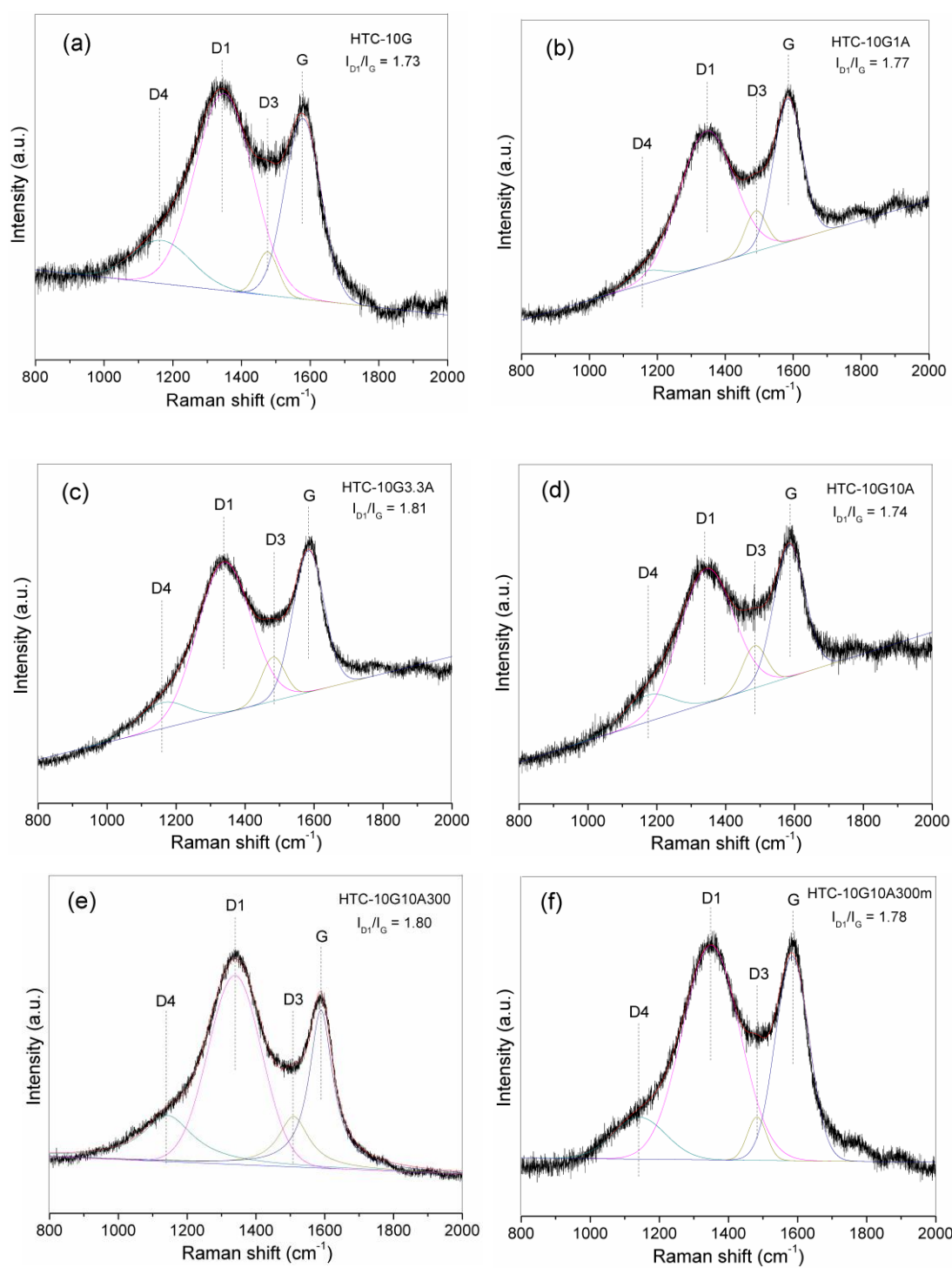
Figure S5. Raman spectra of carboxyl enriched HTC samples. (a) HTC-10G, (b) HTC-10G1A, (c) HTC-10G3.3A, (d) HTC-10G10A, (e) HTC-10G10A300, (f) HTC-10G10A300m.
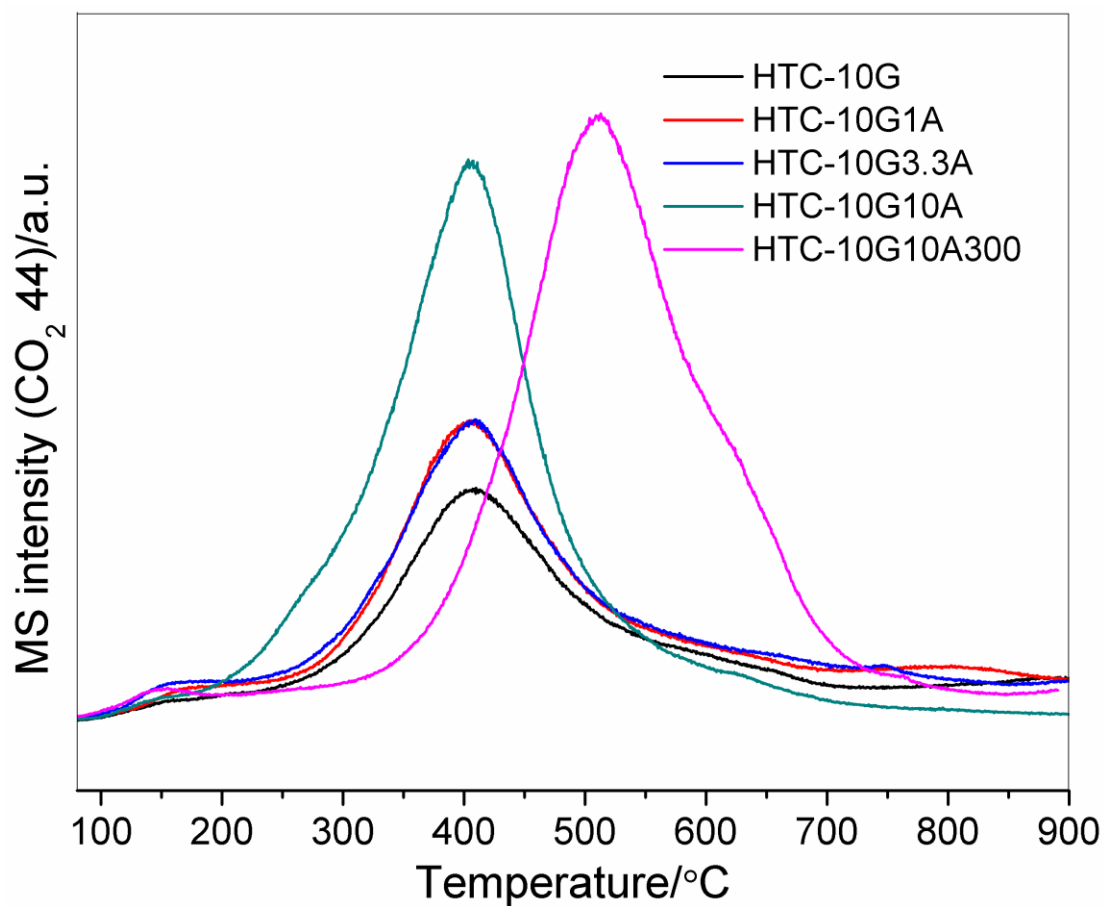
Figure S6. Evolution profiles of CO_2 (m/z=44) during the TPD test of carboxyl enriched HTC.