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Supporting Information

Guanine-Derived Porous Carbonaceous Materials: Towards C_1N_1

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Table S1. Synthetic details.

Entry	Sample	Guanine /g	NaCl/$ZnCl_2$ / g	Temp. treatment program	Carbon yield (%)
1	cG@500-SZ1	1	1	RT to 500 at 1 °C/min, 2 h at 500°C	60
2	cG@500-SZ6	1	6	RT to 500 at 1 °C/min, 2 h at 500°C	64
3	cG@500-SZ10	1	10	RT to 500 at 1 °C/min, 2 h at 500°C	61
4	cG@600-SZ10	1	10	RT to 600 at 1 °C/min, 2 h at 600°C	42
5	cG@700-SZ10	1	10	RT to 700 at 1 °C/min, 2 h at 700°C	33
6	cG@800-SZ1	1	1	RT to 800 at 1 °C/min, 2 h at 800°C	16
7	cG@800-SZ6	1	6	RT to 800 at 1 °C/min, 2 h at 800°C	20
8	cG@800-SZ10	1	10	RT to 800 at 1 °C/min, 2 h at 800°C	22
9	cG@800-SZ15	1	15	RT to 800 at 1 °C/min, 2 h at 800°C	23

Figure S1. Different ion currents measured by MS during thermogravimetric analysis of guanine in N_2 atmosphere.

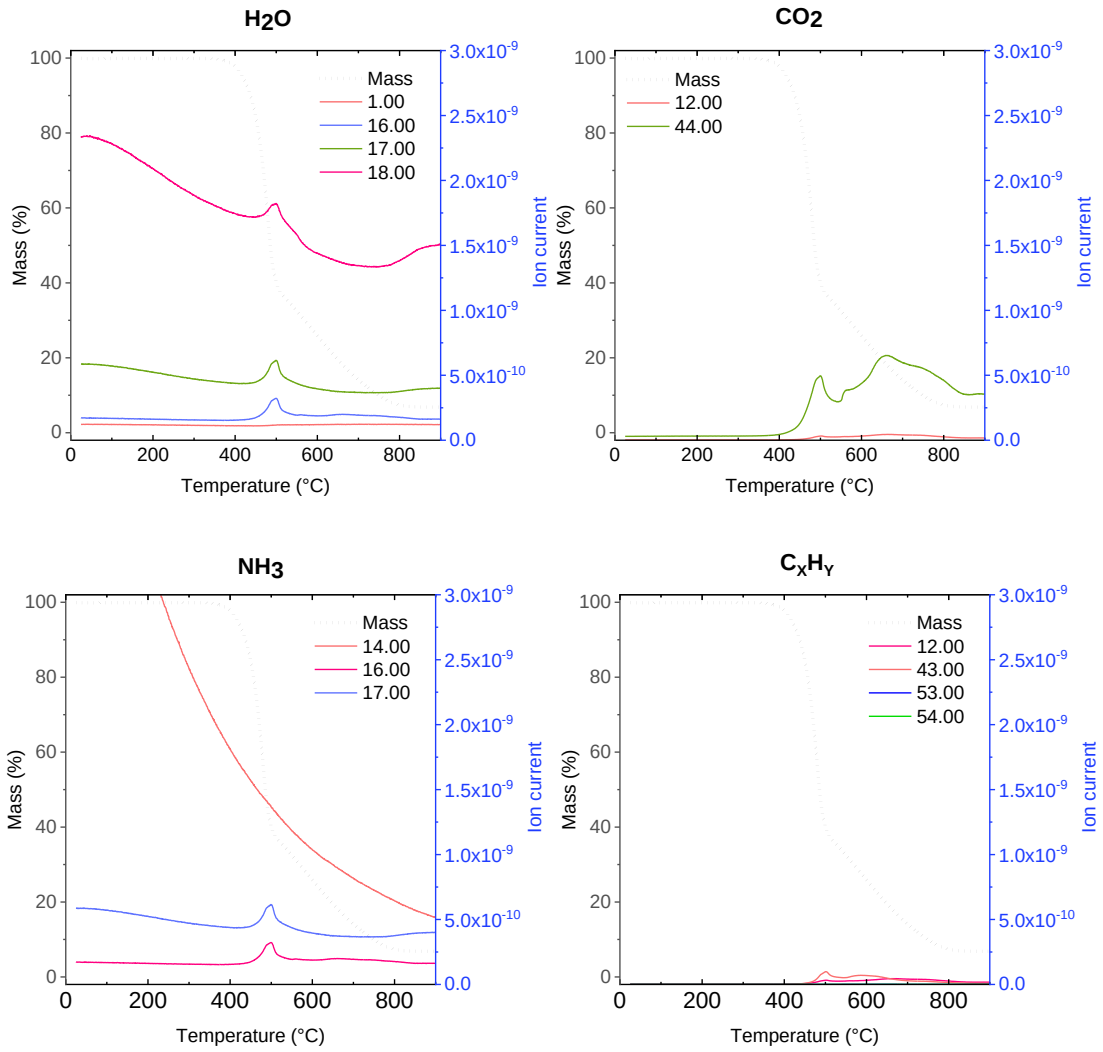

Figure S2. Raman spectra of cG500-SZ10 (A), cG@600-SZ10 (B). cG@700-SZ10 (C) and cG@800-SZ10 (D) with peak deconvolution using Quadratic Savitzky-Golay method.

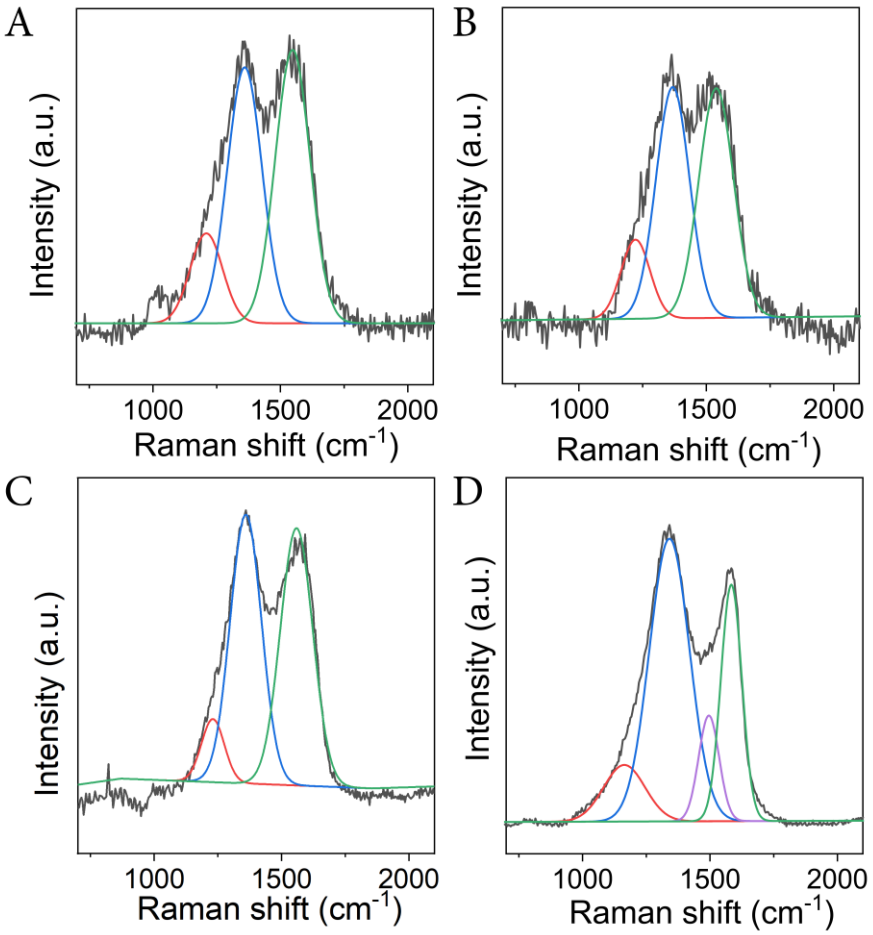

Figure S3. Bright field (upper row) and dark field (lower row) STEM micrographs of cG@800-SZ10 with different magnifications.

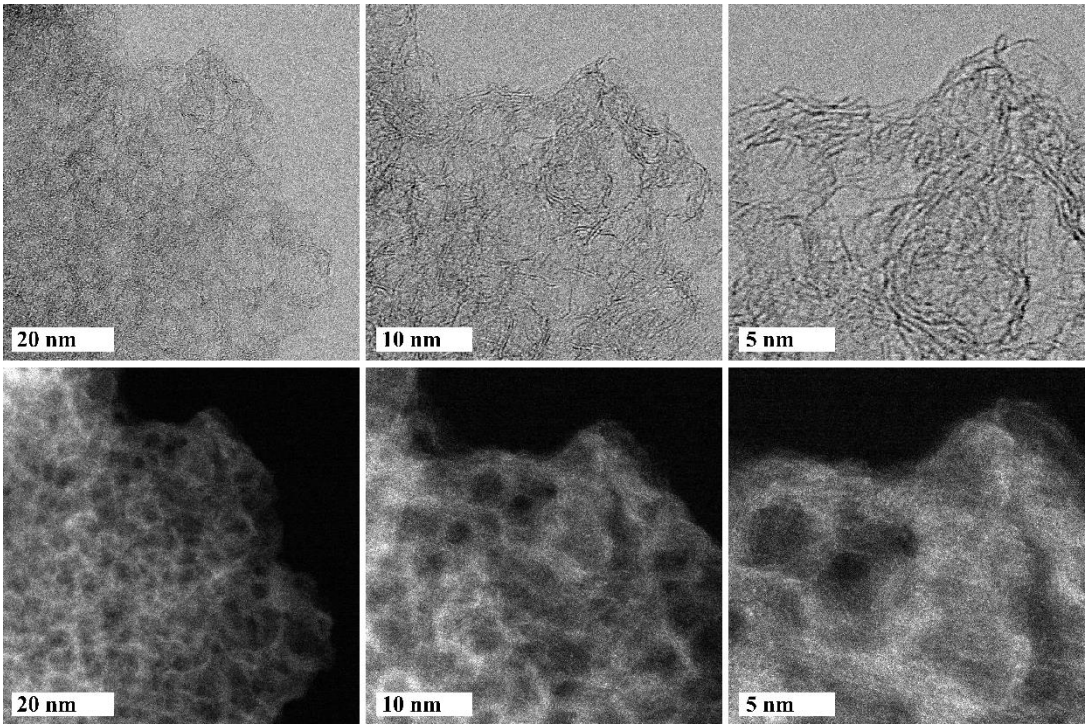

Figure S4. XRD pattern of guanine heat-treated at 500 °C (A) and 800 °C (B) with different precursor to porogen ratio.

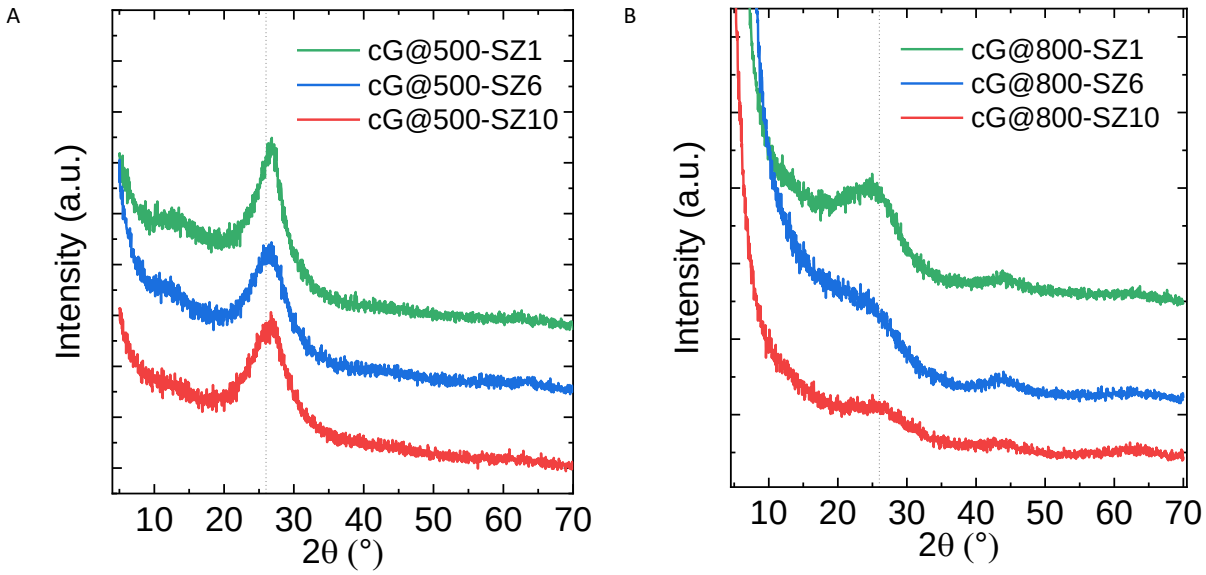

Figure S5. TGA under synthetic air atmosphere of guanine condensed at 500 °C (A) and 800 °C (B) with different porogen to precursor ratios and condensed at different temperatures with a guanine to precursor ratio of 1:10 before activation (C).

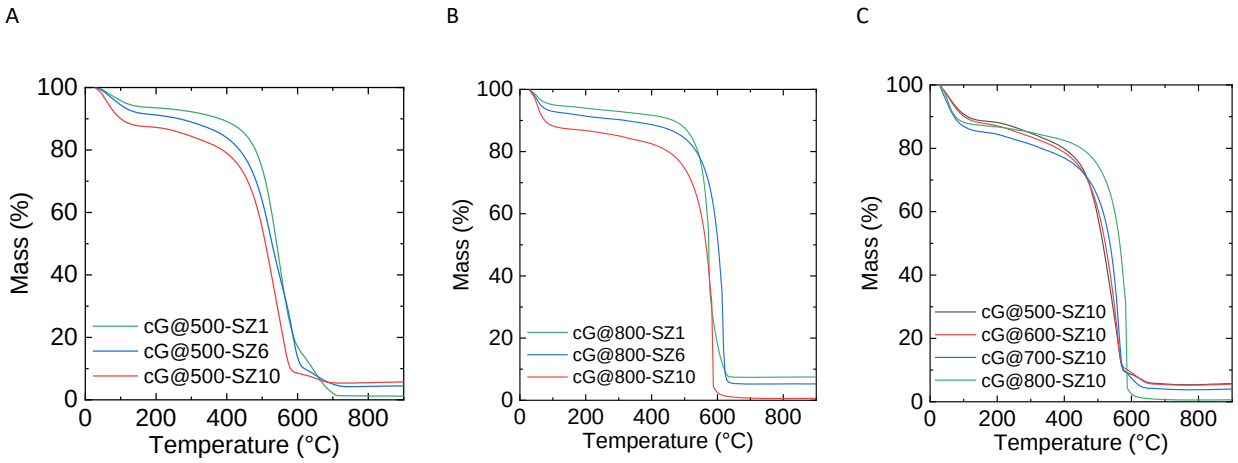

Figure S6. Water related ion currents detected by TGA-MS during thermogravimetric analysis of cG@500-SZ10 (A), cG@600-SZ10 (B), cG@700-SZ10 (C), and cG@800-SZ10 (D).

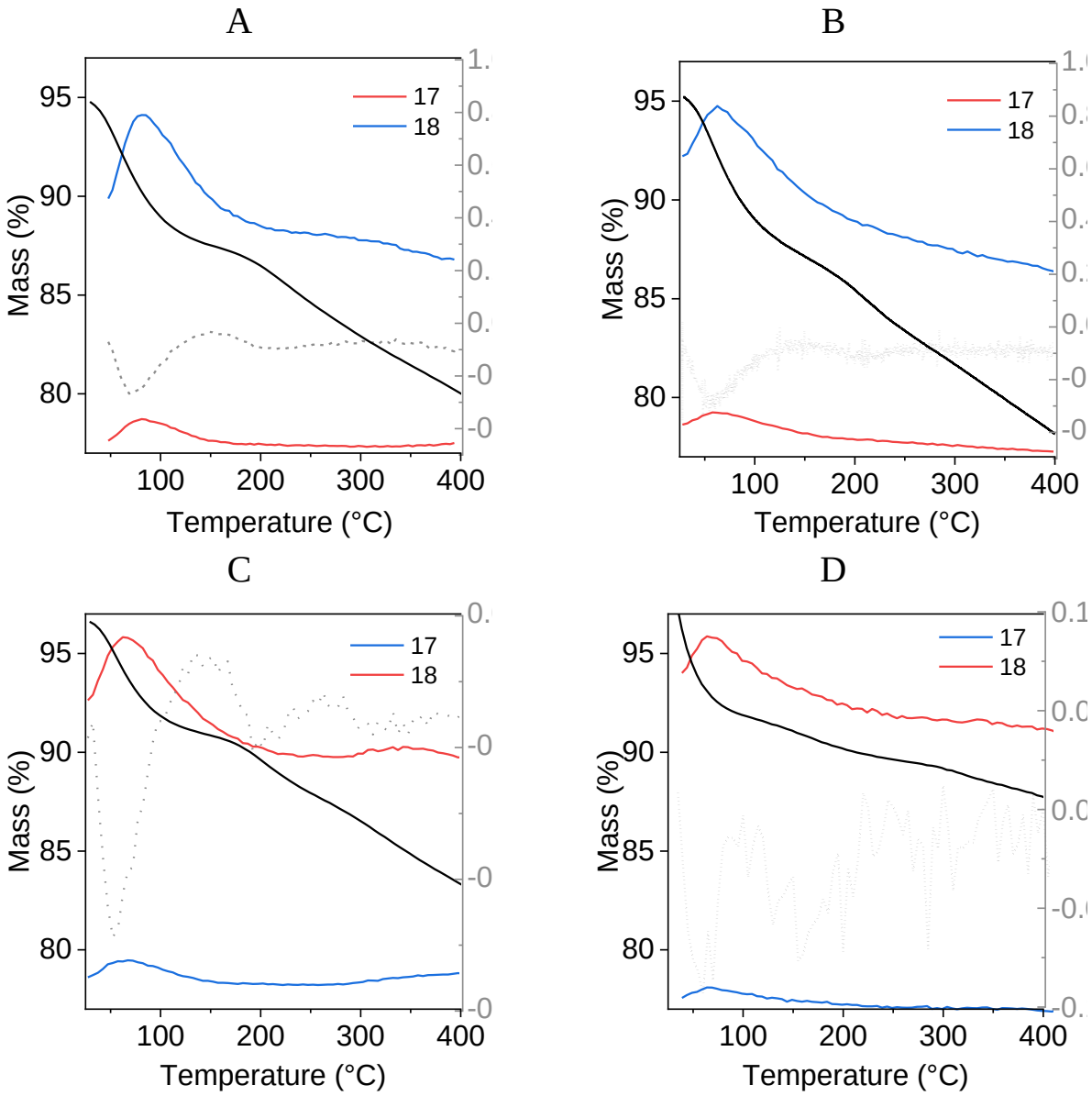

Figure S7. C1s, N1s, and O1s convoluted peaks of samples cG@500-SZ10, cG@700-SZ10, and cG@800-SZ10.

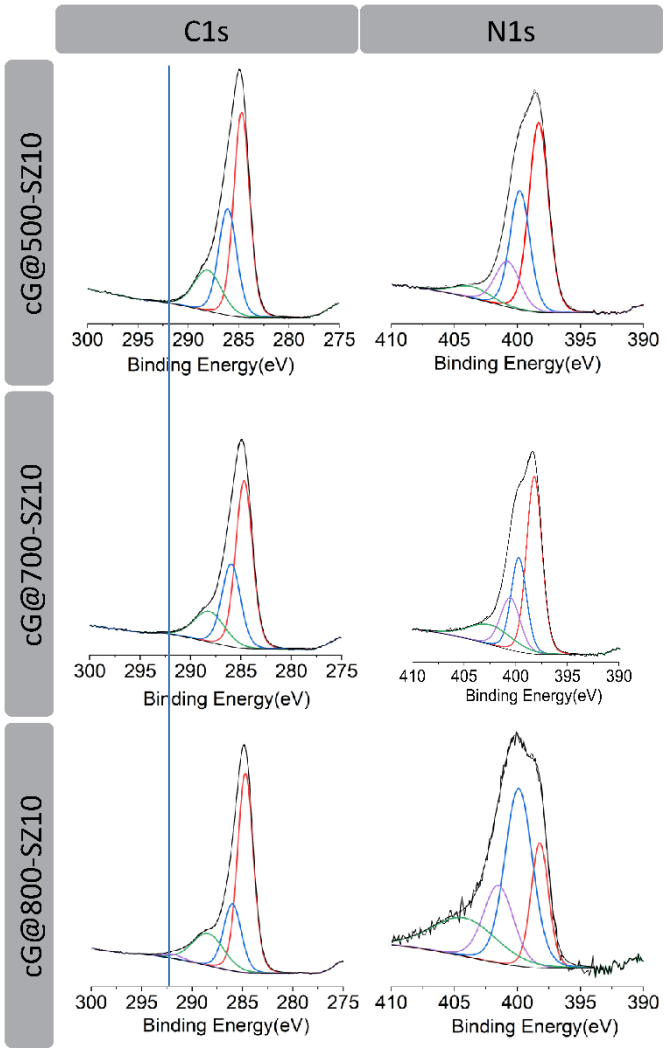

Figure S8. SEM micrograph and EDX elemental mapping of guanine condensed at 500 °C, 600 °C, 700 °C, and 800 °C with a guanine to porogen ratio of 1:10. All scale bars: 10 nm.

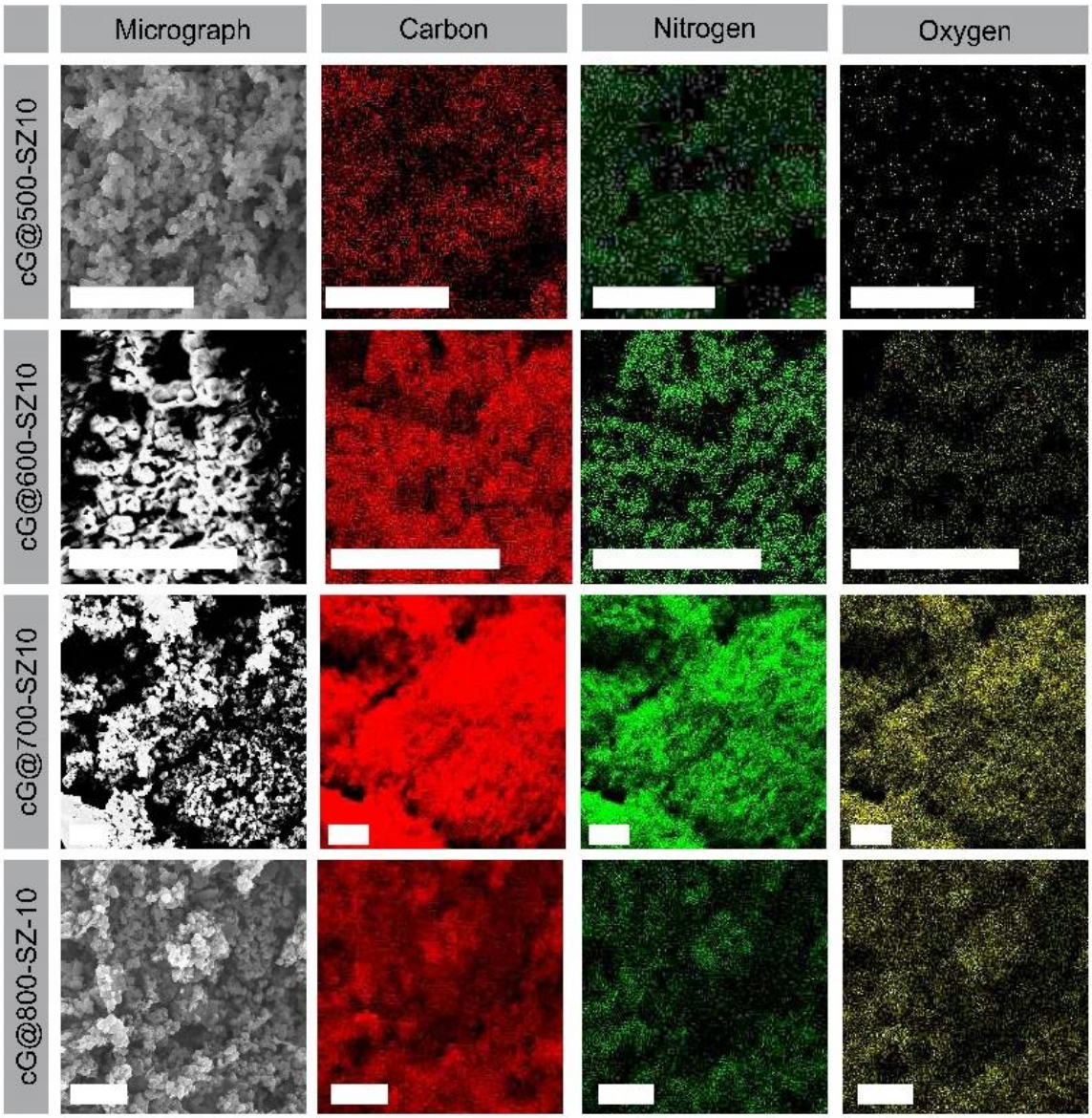

Figure S9. SEM micrographs of guanine condensed at 500 °C (A) and 800 °C (B) with increasing amounts of porogen.

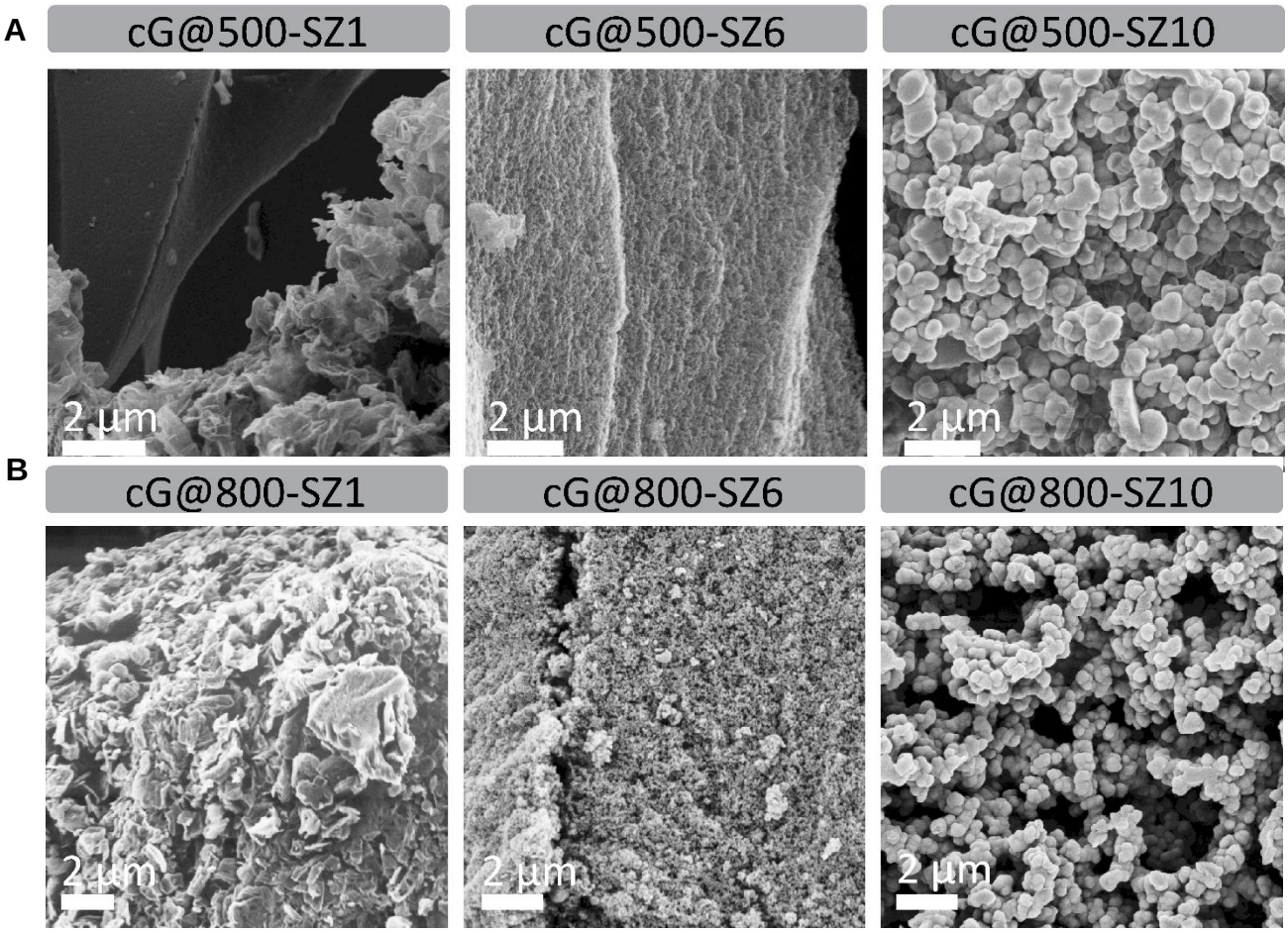

Figure S10. TGA of the mixture of guanine and NZ in a 1:10 ratio.

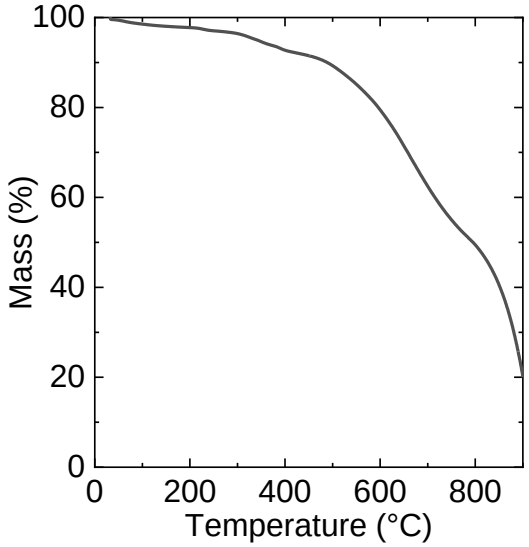

Figure S11. N_2 adsorption/desorption at 77 K (left panel) and CO_2 adsorption/desorption isotherms at 273 K (right panel) of guanine condensed at 500 °C (A and C) and 800 °C (B and D) with an increasing guanine to porogen ratio.

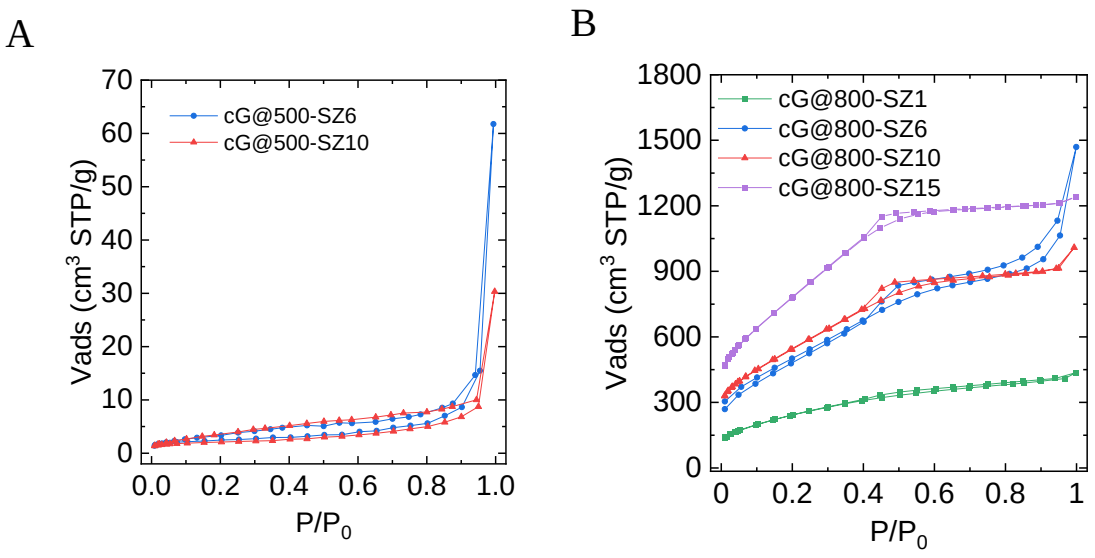

Table S2. Data extracted from N2 physisotption data at 77K and composition according to EDX of cG@800-SZ15.

Sample	S_{BET}	V_T[a]	EDX (at%)		
	m^2g^{-1}	cm^3g^{-1}	C	N	O
cG@800-SZ1	880	0.60	71.4	19.4	3.1
cG@800-SZ6	1894	1.60	78.7	12.9	5.7
cG@800-SZ10	1982	1.42	81.2	11.0	6.7
cG@800-SZ15	2857	1.90	77.3	12.7	10.0

Figure S12. Argon physisorption isotherms (a) and DFT pore size distribution of cG@700-SZ10 (b) and cG@800-SZ10 (c).

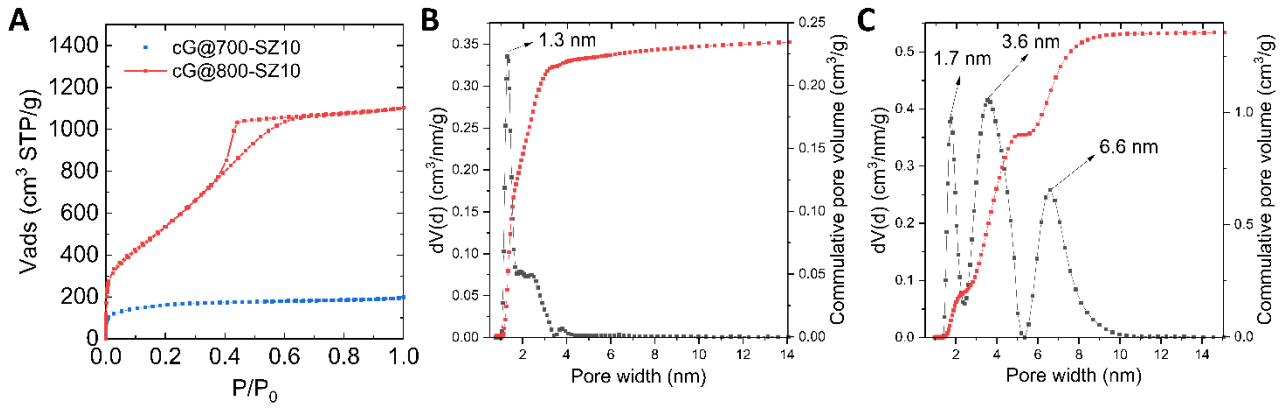

Table S3. Literature overview on Knoevenagel condensation reactions run using nitrogen doped materials as catalysts.

Material	Nitrogen	S_{BET}	Pre-treatment	Reaction compounds	Reaction time / rate	Conversion / selectivity	Ref.
	wt.%	m^2/g		Benzaldehyde +	h / mmol $g^{-1}h^{-1}$	%	
N-doped Carbon	-	625	200 °C, 60 min, argon	Ethylcyanoacetate	20	32.7 / 13.7	[1]
C_3N_4-TEOS			200 °C, 60 min, argon	Ethylcyanoacetate	20	100 / 50.9	[1]
BS-700	4.4	4.6	-	Malononitrile	-	2.2 / 100	[2]
BSNC-600	4.65	962	-	Malononitrile	-	8.3 / 100	[2]
BSNC-700	2.79	1475	-	Malononitrile	-	16.1 / 100	[2]
BSNC-700-tBU	2.79	1475	tBU (1.0 M)	Malononitrile	-	79.9 / 100	[2]
BSNC-800	1.06	2271	-	Malononitrile	-	8.2 / 100	[2]
MM-NH2	1.6	120	Post functionalized with propargylamine	Malononitrile	20	73 / -	[3]
FM-NH2	5.9	480	Post functionalized with propargylamine	Malononitrile	20	74 /-	[3]
MS-NH2	2.1	225	Post functionalized with propargylamine	Malononitrile	20	92 / -	[3]
FS-NH2	3.5	758	Post functionalized with propargylamine	Malononitrile	20	76/ -	[3]
HC-10Bu2IMBr	8.22	170	-	Malononitrile	12	98/ -	[4]
HC-10Bu2IMBr	8.22	170	-	Acetophenon	20	99/ -	[4]
Mpg-C3N4	-	-	-	Malononitrile	2	33 / 74	[5]
Mpg-C3N4-tBu	-	-	tBuOk	Malononitrile	2	80 / 96	[5]
PAN-C500-AO400	17.3 (at.)			Ethyl cyanoacetate	- / 199	- / -	[6]

References

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