Suport Information

A One-Shot Automated Framework Based on LLM and AutoML: Accelerating the Design of Porous Carbon Materials and Carbon Capture Optimization

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Summary:

No. of pages: 74; No. of tables: 6

16 ***Table S1.*** *Carbon capture under different conditions*

Reference	Ingredients	Environmental condition		Textural properties			Ultimate analysis (%)				Synthesis method	CO_2 uptake (mmol/g)
		T (℃)	P(bar)	$S_{BET}(m^2/g)$	$V_{total}(cm^3/g)$	$V_{mic}(cm^3/g)$	C	H	N	O		
1	Tobacco stem	0	1	786	0.447	0.321			0	14.67	Hydrothermal carbonization	4.76
		25	1	786	0.447	0.321			0	14.67		3.31
		25	0.15	786	0.447	0.321			0	14.67		1.04
		0	1	1086	0.598	0.445			0	11.29		6.32
		25	1	1086	0.598	0.445			0	11.29		4.08
		25	0.15	1086	0.598	0.445			0	11.29		1.42
		0	1	1922	0.922	0.788			n.a	8.07		7.98
		25	1	1922	0.922	0.788			n.a	8.07		4.84
		25	0.15	1922	0.922	0.788			n.a	8.07		1.36
		0	1	2399	1.086	0.958			n.a	6.08		6.6
		25	1	2399	1.086	0.958			n.a	6.08		3.96
		25	0.15	2399	1.086	0.958			n.a	6.08		0.81
2	Coffee grounds	35	1	34	0.18	0.01			3.9	n.a	Hydrothermal carbonization	0.14
		50	1	34	0.18	0.01			3.9	n.a		0.12
		35	1	1684	0.94	0.45			1.3	n.a		2.04
		50	1	1684	0.94	0.45			1.3	n.a		0.98
		35	1	992	0.61	0.37			1.9	n.a		2.22
		50	1	992	0.61	0.37			1.9	n.a		1.34
		35	1	990	0.55	0.45			5.1	n.a		2.67
		50	1	990	0.55	0.45			5.1	n.a		1.25
3	Walnut shell	25	1	1047	0.48	0.27			n.a	n.a	Chemical activation	2.76
		25	10	1047	0.48	0.27			n.a	n.a		5.72
		25	1	2707	1.39	0.17			n.a	n.a		3.05
		25	1	2461	1.48	0.13			n.a	n.a		4.49
		25	1	3225	1.99	0.21			n.a	n.a		5.4

		25	1	2319	1.17	0.24			n.a	n.a		5.18
4	Olive stones	30	1	757	0.32	0.3			n.a	n.a	Chemical activation	5.878
		50	1	757	0.32	0.3			n.a	n.a		5.191
		30	1	754	0.58	0.28			n.a	n.a		7.968
		50	1	754	0.58	0.28			n.a	n.a		7.721
5	Coffee Grounds Biochar	0	1	800	0.3	n.a			n.a	n.a	Pyrolytic carbonization	3.9
		25	1	1500	0.8	n.a			n.a	n.a		6.52
	Rice hull	0	1	500	0.2	n.a			n.a	n.a	Chemical Activation	7.25
		0	1	1000	0.5	n.a			n.a	n.a		7.25
	Saw dust	25	1	600	0.25	n.a			n.a	n.a		4.8
		25	1	1200	0.65	n.a			n.a	n.a		4.8
	bagasse	0	1	700	0.3	n.a			n.a	n.a	Hydrothermal carbonization	7
		0	1	1300	0.7	n.a			n.a	n.a		7
6	Arundo donax	0	1	n.a	n.a	n.a	82.3		1.12	n.a	Chemical activation	2
		0	30	n.a	n.a	n.a	82.3		1.12	n.a		4.8
		0	1	627	0.33	0.27	84.2		0.76	n.a		4.1
		0	30	627	0.33	0.27	84.2		0.76	n.a		8.6
		10	1	627	0.33	0.27	84.2		0.76	n.a		3.2
		10	30	627	0.33	0.27	84.2		0.76	n.a		7.3
		15	1	627	0.33	0.27	84.2		0.76	n.a		2.8
		15	30	627	0.33	0.27	84.2		0.76	n.a		7.4
		0	1	735	0.37	0.18	84.7		0.87	n.a		6.3
		10	1	735	0.37	0.18	84.7		0.87	n.a		5
		15	1	735	0.37	0.18	84.7		0.87	n.a		3.6
		0	1	580	0.33	0.15	54.9		0.53	n.a		3.7
		10	1	580	0.33	0.15	54.9		0.53	n.a		3
		15	1	580	0.33	0.15	54.9		0.53	n.a		2.5
7	Olive Stone Biochar	0	1	1300	0.6	n.a	n.a		n.a	n.a	Pyrolytic carbonization	4.8
		25	1	1300	0.6	n.a	n.a		n.a	n.a		2.4
	Coffee Grounds Biochar	0	1	1500	0.7	n.a	n.a		n.a	n.a		5.2
		25	1	1500	0.7	n.a	n.a		n.a	n.a		3

	Walnut Shell Biochar	0	1	1600	0.8	n.a	n.a		n.a	n.a		6
		25	1	1600	0.8	n.a	n.a		n.a	n.a		3.2
	Rice Husk Biochar	0	1	1200	0.5	n.a	n.a		n.a	n.a		4
		25	1	1200	0.5	n.a	n.a		n.a	n.a		2.2
	Sawdust Biochar	0	1	1400	0.6	n.a	n.a		n.a	n.a		5.5
		25	1	1400	0.6	n.a	n.a		n.a	n.a		3.1
8	Sawdust Biochar	25	1	1400	0.6	n.a	n.a		n.a	n.a	Pyrolytic carbonization	3.1
	Coconut shell	25	1	1327	0.65	n.a	n.a		n.a	n.a	Chemical activation	3.9
	Olive Stone Biochar	25	1	1215	0.48	n.a	n.a		n.a	n.a		3.1
	Coffee Grounds Biochar	25	1	590	0.28	n.a	n.a		n.a	n.a		2.4
	Beer Waste	0	1	622	0.32	n.a	n.a		n.a	n.a		3.2
	Empty Fruit Bunch	25	1	2510	1.05	n.a	n.a		n.a	n.a	Hydrothermal carbonization	3.71
9	Wood chip	25	1	1281.6	0.71	0.32	69.22	3.99	0.08	26.30	Downdraft gasification	2.63
		25	1	1012.6	0.56	0.22	64.83	3.64	0.38	30.77		2.59
	70% wood chips and 30% chicken manure	25	1	1408.8	0.83	0.36	72.41	3.63	0.01	23.59		2.92
		25	1	1403.9	0.85	0.33	69.51	4.35	0.76	24.94		2.44
10	40% food waste + 60% wood	25	1	841.3	0.36						Downdraft gasification	3.23
		25	1	667.4	0.29							2.73
11	Spent coffee ground	25	1	645	0.26	0.25	70.86	1.71	3.19	14.72	Chemical activation	3.45
		25	0.15	645	0.26	0.25	70.86	1.71	3.19	14.72		1.43
		25	1	750	0.30	0.29	83.88	1.63	3.27	5.30		3.65
		25	0.15	750	0.30	0.29	83.88	1.63	3.27	5.30		1.46
		25	1	1259	0.52	0.49	87.56	1.06	1.87	0.23		4.33
		25	0.15	1259	0.52	0.49	87.56	1.06	1.87	0.23		1.36
		25	1	1476	0.61	0.60	91.2	0.80	1.67	0		4.54

		25	0.15	1476	0.61	0.60	91.2	0.80	1.67	0		1.30
		25	1	1692	0.71	0.68	94.51	0.58	1.51	0		4.46
		25	0.15	1692	0.71	0.68	94.51	0.58	1.51	0		1.20
		25	1	2337	1.15	0.85	82.66	0.59	1.55	0		3.78
		25	0.15	2337	1.15	0.85	82.66	0.59	1.55	0		0.92
12	Potato starch	30	0.15	1409	0.69	0.51					Hydrothermal carbonization	0.70
		30	0.15	1340	0.66	0.49						0.85
13	Onion pee	30	1	5.4	0						Pyrolytic carbonization	0.74
		30	1	207	0.16							1.43
		30	1	550	0.37							1.68
		30	1	692	0.43							1.59
		30	1	930	0.54							1.57
14	Pine sawdust	25	1	1728.66	0.70	0.67	93.40	0.73	0.89	6.79	Pyrolytic carbonization	4.21
		25	1	2279.52	0.99	0.91	96.96	0.18	0.99	4.51		3.46
		25	1	2330.89	1.91	0.98	87.57	0.17	1.30	7.35		2.45
15	Date	25	1	2112	0.94	0.86					Pyrolytic carbonization	4.18
		25	1	3255	1.65	1.29						3.35
		25	1	3337	2.05	0.54						2.90
		25	1	1634	0.76	0.56						4.14
		25	1	2367	1.15	0.83						4.36
		25	1	2844	1.63	0.89						3.65
16	Bee-collected pollen	25	1	232	0.11	0.09	80.82		2.34	15.36	Pyrolytic carbonization	1.77
		25	0.15	232	0.11	0.09	80.82		2.34	15.36		0.98
		25	1	332	0.16	0.12	76.25		1.89	21.86		2.10
		25	0.15	332	0.16	0.12	76.25		1.89	21.86		1.04
		25	1	937	0.40	0.38	77.57		1.54	20.89		3.38
		25	0.15	937	0.40	0.38	77.57		1.54	20.89		1.18
		25	1	1214	0.53	0.48	79.37		1.18	19.45		3.40
		25	0.15	1214	0.53	0.48	79.37		1.18	19.45		0.85
		25	1	1460	0.63	0.53	93.10		0.31	6.59		3.42
		25	0.15	1460	0.63	0.53	93.10		0.31	6.59		0.69

17	Garlic peel	25	1	1049	0.69	0.43					Pyrolytic carbonization	3.80
		25	1	1248	0.68	0.52						4.10
18	Biomass tar	25	1	1898	1.52	0.43					Chemical activation	2.44
		0	1	1898	1.52	0.43						3.81
		25	0.15	1898	1.52	0.43						0.80
		25	1	1790	1.21	0.48						2.71
		0	1	1790	1.21	0.48						4.40
		25	0.15	1790	1.21	0.48						0.74
		25	1	2424	1.38	0.51						2.67
		0	1	2424	1.38	0.51						4.10
		25	0.15	2424	1.38	0.51						0.70
		25	1	2358	1.85	0.49						2.92
		0	1	2358	1.85	0.49						4.77
		25	0.15	2358	1.85	0.49						1.01
		25	1	1829	1.25	0.49						3.13
		0	1	1829	1.25	0.49						5.03
		25	0.15	1829	1.25	0.49						1.20
		25	1	1684	1.43	0.48						2.75
		0	1	1684	1.43	0.48						4.62
		25	0.15	1684	1.43	0.48						0.68
19	Biomass tar	25	1	660	0.28	0.24	83.48		3.53	12.98	Chemical activation	2.94
		0	1	660	0.28	0.24	83.48		3.53	12.98		4.22
		25	0.15	660	0.28	0.24	83.48		3.53	12.98		0.74
		25	1	1076	0.44	0.38	84.57		3.03	9.46		4.11
		0	1	1076	0.44	0.38	84.57		3.03	9.46		6.02
		25	0.15	1076	0.44	0.38	84.57		3.03	9.46		1.64
		25	1	1268	0.55	0.50	90.49		2.12	7.39		3.64
		0	1	1268	0.55	0.50	90.49		2.12	7.39		5.43
		25	0.15	1268	0.55	0.50	90.49		2.12	7.39		1.22
		25	1	1480	0.71	0.48	89.42		2.08	7.04		3.31
		0	1	1480	0.71	0.48	89.42		2.08	7.04		5.41

		25	0.15	1480	0.71	0.48	89.42		2.08	7.04		1.52
		25	1	1161	0.38	0.35	88.44		3.02	8.53		3.69
		0	1	1161	0.38	0.35	88.44		3.02	8.53		5.82
		25	0.15	1161	0.38	0.35	88.44		3.02	8.53		1.38
		25	1	1804	0.85	0.66	89.93		2.00	8.07		3.16
		0	1	1804	0.85	0.66	89.93		2.00	8.07		5.20
		25	0.15	1804	0.85	0.66	89.93		2.00	8.07		0.96
		25	1	1857	0.87	0.48	92.01		1.32	6.67		3.06
		0	1	1857	0.87	0.48	92.01		1.32	6.67		5.04
		25	0.15	1857	0.87	0.48	92.01		1.32	6.67		0.92
20	Glucose	25	1	972	0.49	0.39				14.24	Pyrolytic carbonization	3.01
		0	1	972	0.49	0.39				14.24		4.33
		25	0.15	972	0.49	0.39				14.24		0.95
		25	1	1515	0.90	0.62				11.18		4.19
		0	1	1515	0.90	0.62				11.18		6.38
		25	0.15	1515	0.90	0.62				11.18		1.18
		25	1	1815	1.02	0.74				11.26		3.91
		0	1	1815	1.02	0.74				11.26		6.25
		25	0.15	1815	1.02	0.74				11.26		0.87
		25	1	2305	1.12	0.93				7.83		3.96
		0	1	2305	1.12	0.93				7.83		6.99
		25	0.15	2305	1.12	0.93				7.83		0.93
21	Banana stems	25	1	909	0.44	0.32	79.50	1.50		19.00	Pyrolytic carbonization	3.20
		0	1	909	0.44	0.32	79.50	1.50		19.00		5.30
	Banana fiber	25	1	1260	0.81	0.56	84.00	2.00		14.00		5.00
		0	1	1260	0.81	0.56	84.00	2.00		14.00		7.10
22	Flesh from sunflower receptacle	25	1	3072	1.77	0.78	91.02	2.71	0.40	5.87	Pyrolytic carbonization	2.78
		0	1	3072	1.77	0.78	91.02	2.71	0.40	5.87		4.09
		25	1	2730	1.84	1.12	94.50	0.95	0.80	3.75		2.34
		0	1	2730	1.84	1.12	94.50	0.95	0.80	3.75		4.08

	Flesh from sunflower stalk	25	1	654	0.46	0.36	77.12	1.08	0.75	21.05		3.08
		0	1	654	0.46	0.36	77.12	1.08	0.75	21.05		4.52
23	Cellulose fibers	25	1	473	0.20	0.17	88.40	2.20	0	9.40	Hydrothermal carbonization	1.72
		25	0.15	473	0.20	0.17	88.40	2.20	0	9.40		0.70
		25	1	593	0.25	0.21	83.70	0.60	0	15.70		2.33
		25	0.15	593	0.25	0.21	83.70	0.60	0	15.70		0.90
	P.nigra wood	25	1	217	0.12	0.13	89.60	2.60	1.00	6.80		1.12
		25	0.15	217	0.12	0.13	89.60	2.60	1.00	6.80		0.50
24	Camphor leaves	25	1	721	0.35	0.29			3.00		Pyrolytic carbonization	2.77
		0	1	721	0.35	0.29			3.00			4.50
		25	1	1146	0.55	0.47			1.50			3.74
		0	1	1146	0.55	0.47			1.50			5.86
		25	1	1446	0.68	0.49			0.80			2.81
		0	1	1446	0.68	0.49			0.80			5.26
		25	1	1736	0.87	0.36			0.70			2.42
		0	1	1736	0.87	0.36			0.70			4.80
25	Corn stover	0	1	955	0.43	0.31	57.46	3.37	0.66		Pyrolytic carbonization	4.93
		0	1	1539	0.72	0.48	59.20	3.70	0.34			6.80
		0	1	2442	1.56	0.86	60.41	3.91	0.24			7.14
		0	1	2225	1.11	0.49	64.90	3.12	0.24			5.79
		0	1	1543	0.71	0.61	66.56	2.99	0.86			5.06
		0	1	2201	1.31	0.69	56.55	3.03	0.31			6.22
		0	1	2170	1.27	0.66	54.94	2.19	0.32			4.86
		0	1	1630	0.69	0.60	76.91	2.43	0.20			6.47
		0	1	2132	1.13	0.70	59.22	3.88	0.23			6.85
		0	1	1862	0.81	0.69	58.22	3.79	0.22			6.32
7	Stem of Arundo donax	0	1	637	0.35	0.25					Chemical activation	4.00
		0	1	1122	0.59	0.50						6.30
		0	1	849	0.50	0.31						3.70
		25	1	1019	0.71	0.10						2.40

26	Fresh cauliflower	25	1	1107	0.79	0.13					Pyrolytic carbonization	2.70
		25	1	1139	1.26	0.24						3.10
27	Lotus stem	25	1	2091	0.87	0.65					Pyrolytic carbonization	3.85
		0	1	2091	0.87	0.65						6.17
		25	1	2893	1.59	0.70						2.84
		0	1	2893	1.59	0.70						4.61
28	Sawdust	25	1	1511	0.65	0.54	78.20	1.90		19.90	Pyrolytic carbonization	4.30
		25	0.15	1511	0.65	0.54	78.20	1.90		19.90		1.20
		25	1	1830	0.78	0.67	83.40	0.90		15.70		4.90
		25	0.15	1830	0.78	0.67	83.40	0.90		15.70		1.10
		25	1	2163	0.93	0.74	88.10	0.40		11.50		4.70
		25	0.15	2163	0.93	0.74	88.10	0.40		11.50		1.10
		25	1	2610	1.15	0.74	88.70	0.40		10.90		4.00
		25	0.15	2610	1.15	0.74	88.70	0.40		10.90		0.90
29	Vine shoot	0	1	2.48							Pyrolytic carbonization	2.18
		0	0.15	2.48								1.18
		0	1	46.3								2.21
		0	0.15	46.3								1.20
		0	1	374	0.19	0.11						3.45
		0	0.15	374	0.19	0.11						1.68
		0	1	538	0.24	0.18						3.19
		0	0.15	538	0.24	0.18						1.76
		0	1	1032	0.49	0.35						4.38
		0	0.15	1032	0.49	0.35						1.92
		0	1	864	0.41	0.28						3.74
		0	0.15	864	0.41	0.28						1.78
		0	1	1439	0.67	0.49						6.08
		0	0.15	1439	0.67	0.49						2.27
		0	1	704	0.29	0.24						4.16
		0	0.15	704	0.29	0.24						2.16
		0	1	1101	0.54	0.38						5.36

		0	0.15	1101	0.54	0.38						2.42
		0	1	1305	0.53	0.45						6.04
		0	0.15	1305	0.53	0.45						2.25
		0	1	1671	0.67	0.59						5.40
		0	0.15	1671	0.67	0.59						2.25
30	Pomegranate peel	25	1	585	0.28	0.20					Chemical activation	4.11
		0	1	585	0.28	0.20						6.03
	Carrot peel	25	1	1379	0.58	0.51						4.18
		0	1	1379	0.58	0.51						5.64
	Fern leaves	25	1	1593	0.74	0.54						4.12
		0	1	1593	0.74	0.54						4.52
31	Jujun grass	25	1	1048	0.51	0.43					Pyrolytic carbonization	4.30
		25	0.15	1048	0.51	0.43						1.50
		25	1	1512	0.74	0.62						4.90
		25	0.15	1512	0.74	0.62						1.50
		25	1	2735	1.47	0.94						3.80
		25	0.15	2735	1.47	0.94						0.90
		25	1	2396	1.15	0.96						3.50
		25	0.15	2396	1.15	0.96						0.90
		25	1	3144	1.56	1.23						4.10
		25	0.15	3144	1.56	1.23						0.90
		25	1	2957	1.72	0.75						2.80
		25	0.15	2957	1.72	0.75						0.60
	Camellia japonica	25	1	1150	0.56	0.47					Pyrolytic carbonization	4.70
		25	0.15	1150	0.56	0.47						1.50
		25	1	1353	0.67	0.56						5.00
		25	0.15	1353	0.67	0.56						1.50
		25	1	1917	0.99	0.75						3.70
		25	0.15	1917	0.99	0.75						0.90
		25	1	2345	1.20	0.89						3.10
		25	0.15	2345	1.20	0.89						0.80

		25	1	2983	1.50	1.14						3.00
		25	0.15	2983	1.50	1.14						0.70
		25	1	3537	1.85	1.21						2.80
		25	0.15	3537	1.85	1.21						0.60
32	Empty fruit bunch	25	1	1163	0.23	0.10					Pyrolytic carbonization	0.66
		25	1	2239	0.88	0.19						0.85
		25	1	1720	0.56	0.15						2.81
		25	1	1322	0.78	0.23						3.40
		25	1	2510	1.05	0.55						3.71
		25	1	2100	0.78	0.29						2.18
33	Black locust	25	1	1175	0.55	0.49	83.43	1.52	0	15.05	Pyrolytic carbonization	1.85
		0	1	1175	0.55	0.49	83.43	1.52	0	15.05		2.79
		25	0.15	1175	0.55	0.49	83.43	1.52	0	15.05		0.75
		25	1	2064	0.98	0.87	74.36	1.15	0	24.49		3.75
		0	1	2064	0.98	0.87	74.36	1.15	0	24.49		5.86
		25	0.15	2064	0.98	0.87	74.36	1.15	0	24.49		1.21
34	Yellow mombin fruit stones	0	1	252	0.14						Pyrolytic carbonization	5.80
		0	1	358	0.17							7.00
		0	1	1384	0.63							8.60
35	1 g Gelatin + 2 g Starch	25	1	1714	0.83		75.90	2.17	0.65	12.76	Pyrolytic carbonization	3.28
	1 g Gelatin + 1 g Starch	25	1	1636	0.51		71.40	3.75	3.00	21.12		3.84
	2 g Gelatin + 1 g Starch	25	1	1957	0.79		71.20	1.97	2.75	19.57		3.45
	1 g Gelatin	25	1	1294	0.63		74.48	2.42	0.39	16.60		3.30
	1 g Starch	25	1	714	0.40		70.85	2.43		18.90		2.81
36	Rice husk	25	1	774	0.41	0.30			0.75		Pyrolytic carbonization	3.53
		0	1	774	0.41	0.30			0.75			4.88
		25	0.15	774	0.41	0.30			0.75			1.51
		25	1	1041	0.53	0.42			0.48			4.16
		0	1	1041	0.53	0.42			0.48			5.63

		25	0.15	1041	0.53	0.42			0.48			1.55
		25	1	1199	0.60	0.48			0.36			3.87
		0	1	1199	0.60	0.48			0.36			6.02
		25	0.15	1199	0.60	0.48			0.36			1.28
		25	1	2695	1.14	1.11			0.45			3.71
		0	1	2695	1.14	1.11			0.45			6.24
		25	0.15	2695	1.14	1.11			0.45			0.92
37	Peanut shell	25	1	1713	0.73	0.73	88.00	1.10	0.98		Pyrolytic carbonization	4.41
		0	1	1713	0.73	0.73	88.00	1.10	0.98			7.25
		25	1	1893	0.79	0.78	89.70	0.80	0.79			4.22
		0	1	1893	0.79	0.78	89.70	0.80	0.79			7.12
		25	1	1871	0.80	0.79	90.50	0.60	0.60			3.92
		0	1	1871	0.80	0.79	90.50	0.60	0.60			6.79
38	Poplar anthers	25	1	1473	0.60	0.57			3.81		Pyrolytic carbonization	4.18
		25	0.1	1473	0.60	0.57			3.81			0.91
		25	1	1913	0.78	0.74			2.32			4.02
		25	0.1	1913	0.78	0.74			2.32			0.67
		25	1	1698	0.70	0.62			2.56			3.52
		25	0.1	1698	0.70	0.62			2.56			0.73
		25	1	1123	0.47	0.43			4.01			4.12
		25	0.1	1123	0.47	0.43			4.01			1.04
		25	1	1976	0.86	0.77			3.11			3.93
		25	0.1	1976	0.86	0.77			3.11			0.79
		25	1	2356	1.26	0.86			1.50			3.30
		25	0.1	2356	1.26	0.86			1.50			0.53
		25	1	837	0.38	0.32			4.84			3.61
		25	0.1	837	0.38	0.32			4.84			1.06
		25	1	2571	1.15	1.02			2.22			3.39
		25	0.1	2571	1.15	1.02			2.22			0.57
		25	1	3322	2.31	0.89			1.26			2.04
		25	0.1	3322	2.31	0.89			1.26			0.25

39	Pine nut shell	25	1	966	0.40						Pyrolytic carbonization	3.50
		25	1	1004	0.43							4.50
		25	1	1486	0.64							5.00
		25	1	1682	0.70							4.60
		25	1	1944	0.81							4.00
		25	1	459	0.20							3.20
		25	1	1343	0.56							4.70
		25	1	1637	0.71							4.30
		25	1	2207	1.23							3.50
40	Macadamia nut shells	25	1	469							Pyrolytic carbonization	3.07
		25	1	489								3.30
		25	1	606								3.40
		25	1	425								2.80
		25	1	514								3.25
		25	1	605								3.45
		25	1	441								2.99
		25	1	512								3.37
		25	1	573								3.48
		25	1	434								3.01
		25	1	524								3.42
		25	1	633								3.73
41	Pineapple waste	25	1	124			84.82	1.56	1.30		Pyrolytic carbonization	1.16
		0	1	124			84.82	1.56	1.30			1.39
		25	1	224.1			86.06	1.55	1.69			1.18
		0	1	224.1			86.06	1.55	1.69			1.37
		25	1	422.8			80.01	1.16	1.52			2.22
		0	1	422.8			80.01	1.16	1.52			2.71
		25	1	302.7			81.12	0.75	1.30			1.59
		0	1	302.7			81.12	0.75	1.30			2.09
		25	1	328.2			84.98	0.20	1.59			1.33
		0	1	328.2			84.98	0.20	1.59			1.65

		25	1	644.9			73.52	1.09	1.49			3.16
		0	1	644.9			73.52	1.09	1.49			3.82
		25	1	186			85.04	0.48	1.12			1.35
		0	1	186			85.04	0.48	1.12			1.90
		25	1	397.3			83.29	0.17	1.58			1.59
		0	1	397.3			83.29	0.17	1.58			2.20
		25	1	1076.3			86.31	0.14	0.33			4.25
		0	1	1076.3			86.31	0.14	0.33			5.32
42	Agar	25	1	671	0.43				10.55		Pyrolytic carbonization	2.30
		25	1	886	0.57				10.02			2.60
		25	1	1033	0.69				9.71			2.40
		25	1	858	0.57				7.29			2.50
		25	1	1142	0.85				6.65			2.50
		25	1	1316	1.14				5.68			2.50
43	Agar	25	1	1005	0.49	0.40			5.11		Chemical activation	3.70
		0	1	1005	0.49	0.40			5.11			6.00
		25	1	910	0.44	0.36			7.33			3.60
		0	1	910	0.44	0.36			7.33			5.90
		25	1	1239	0.61	0.48			6.08			3.70
		0	1	1239	0.61	0.48			6.08			6.50
		25	1	1500	0.74	0.53			5.56			3.10
		0	1	1500	0.74	0.53			5.56			5.90
		25	1	1830	0.91	0.42			5.07			2.50
		0	1	1830	0.91	0.42			5.07			4.60
		25	1	1448	0.71	0.55			7.23			3.20
		0	1	1448	0.71	0.55			7.23			6.10
		25	1	1423	0.71	0.53			8.58			3.20
		0	1	1423	0.71	0.53			8.58			5.80
44	Hazelnut shell	25	1	502	0.22		85.21	5.8	2.74		Pyrolytic carbonization	2.24
		25	1	1991	0.88		87.21	5.03	2.94			3.72
		25	1	1833	0.80		86.24	5.31	3.21			3.39

		25	1	1099	0.45		86.32	5.99	2.53			4.32
		25	1	1821	0.79		86.74	5.87	2.75			3.50
		25	1	2185	0.99		87.02	6.01	2.97			3.48
		25	1	1343	0.55		87.65	5.24	1.98			3.94
		25	1	2318	1.03		88.34	5.87	2.14			3.52
		25	1	2321	1.11		88.21	5.21	2.30			3.38
45	Walnut shell powders	25	1	759	0.44	0.33	51.21	1.96	4.45		Chemical activation	2.32
		0	1	759	0.44	0.33	51.21	1.96	4.45			3.30
		25	1	1606	0.97	0.78	71.19	2.88	4.02			1.92
		0	1	1606	0.97	0.78	71.19	2.88	4.02			2.90
		25	1	1741	0.86	0.80	64.43	3.21	2.20			2.74
		0	1	1741	0.86	0.80	64.43	3.21	2.20			4.73
		25	1	1636	0.74	0.68	54.00	3.7	2.69			2.86
		0	1	1636	0.74	0.68	54.00	3.7	2.69			5.00
		25	1	2251	1.21	1.03	70.44	1.62	0.94			2.54
		0	1	2251	1.21	1.03	70.44	1.62	0.94			4.20
		25	1	3079	1.84	1.18	80.49	1.20	2.08			2.53
		0	1	3079	1.84	1.18	80.49	1.20	2.08			3.35
		25	1	2354	1.26	0.97	75.38	1.30	0.86			3.04
		0	1	2354	1.26	0.97	75.38	1.30	0.86			5.13
		25	1	2556	1.90	0.96	81.84	1.75	0.76			2.27
		0	1	2556	1.90	0.96	81.84	1.75	0.76			3.35
		25	1	1000	0.68	0.53	51.67	1.75	1.57			2.37
		0	1	1000	0.68	0.53	51.67	1.75	1.57			2.57
46	Walnut shell	25	1	1636	0.74	0.68	54.00	3.75	2.69	39.56	Pyrolytic carbonization	2.86
		25	0.15	1636	0.74	0.68	54.00	3.75	2.69	39.56		0.67
		25	1	2354	1.26	0.97	75.38	1.30	0.86	22.46		3.08
		25	0.15	2354	1.26	0.97	75.38	1.30	0.86	22.46		0.64
		25	1	1144	0.64	0.48	68.18	1.57	4.80	25.45		2.10
		25	0.15	1144	0.64	0.48	68.18	1.57	4.80	25.45		0.36
		25	1	1813	1.05	0.70	80.95	0.79	1.00	17.26		2.14

		25	0.15	1813	1.05	0.70	80.95	0.79	1.00	17.26		0.38
		25	1	273	0.19	0.13	46.52	1.55	9.32	42.61		1.78
		25	0.15	273	0.19	0.13	46.52	1.55	9.32	42.61		0.69
		25	1	481	0.27	0.24	52.01	1.92	8.75	37.32		1.83
		25	0.15	481	0.27	0.24	52.01	1.92	8.75	37.32		0.67
47	Walnut shell	25	1	419	0.25	0.19	54.24	3.37	3.79		Pyrolytic carbonization	1.93
		0	1	419	0.25	0.19	54.24	3.37	3.79			2.60
		25	1	589	0.34	0.27	63.53	4.38	7.24			2.53
		0	1	589	0.34	0.27	63.53	4.38	7.24			4.17
		25	1	802	0.47	0.37	57.60	3.45	1.52			1.96
		0	1	802	0.47	0.37	57.60	3.45	1.52			3.88
		25	1	516	0.28	0.20	52.55	3.35	3.52			1.70
		0	1	516	0.28	0.20	52.55	3.35	3.52			2.67
		25	1	1687	0.94	0.77	72.63	3.18	1.89			3.06
		0	1	1687	0.94	0.77	72.63	3.18	1.89			5.22
		25	1	1721	0.92	0.75	61.53	1.45	2.54			2.15
		0	1	1721	0.92	0.75	61.53	1.45	2.54			3.17
48	Tea seed shell	25	1	1065	0.47	0.39	59.43	1.24	2.43		Pyrolytic carbonization	2.69
		25	1	1188	0.52	0.44	66.21	0.94	3.41			2.75
		25	1	1055	0.46	0.39	61.47	1.16	3.45			2.44
		25	1	706	0.33	0.25	48.26	1.77	3.39			1.95
49	Water chestnut shell	25	1	669	0.31		71.42	3.06	3.05		Pyrolytic carbonization	3.29
		25	1	1450	0.61		73.24	3.01	3.58			3.63
		25	1	1310	0.65		74.25	3.01	3.58			3.18
		25	1	1036	0.44		76.21	3.01	2.73			4.06
		25	1	2412	1.14		75.20	2.75	3.14			4.04
		25	1	2596	1.42		73.58	2.80	3.35			3.59
		25	1	1416	0.58		77.43	2.42	2.42			4.50
		25	1	2615	1.38		76.52	2.53	2.65			3.60
		25	1	2446	1.59		76.03	2.86	3.12			3.39
		25	1	852	0.38	0.31	85.90		3.03	10.87		4.39

50	Palm kernel shell	25	1	1185	0.52	0.43	90.97		3.35	5.54	Pyrolytic carbonization	4.80
		25	1	694	0.37	0.25	88.31		1.95	9.53		3.39
		25	1	699	0.49	0.16	92.63		1.73	5.45		2.56
		25	1	586	0.31	0.19	88.52	0	2.94	8.24		2.84
51	Water chestnut	25	1	2998	1.78	1.22			7.50		Chemical activation	3.60
		25	1	3277	1.94	1.37			5.50			4.10
		25	1	3401	2.50	1.87			4.89			4.70
		25	1	3138	2.43	1.33			2.73			3.20
52	Coconut shell	25	1	947	0.35		96.59	0.94	2.76		Pyrolytic carbonization	3.45
		25	1	1082	0.39		87.48	0.88	2.74			3.71
		25	1	1324	0.51		91.35	0.82	1.52			3.49
		25	1	1199	0.47		91.08	0.82	1.52			3.07
		25	1	1354	0.58		88.71	0.55	1.34			3.03
		25	1	1329	0.56		91.35	0.56	1.13			2.86
		25	1	1430	0.65		91.24	0.65	0.86			2.78
53	Coconut shell	25	1	1023	0.38		84.20	1.52	1.35		Pyrolytic carbonization	4.10
		25	1	1383	0.56		83.20	1.32	1.08			4.00
		25	1	1604	0.65		84.20	1.53	0.81			4.30
		25	1	1178	0.49		82.00	1.34	1.23			4.10
		25	1	1535	0.60		81.30	1.22	0.91			4.80
		25	1	1687	0.67		83.00	1.29	0.70			4.30
		25	1	1550	0.62		84.20	1.0	0.86			4.10
		25	1	1596	0.64		86.30	0.92	0.73			4.70
		25	1	1937	0.78		86.50	0.84	0.61			4.44
		25	1	1012	0.44		75.50	0.95	8.01			3.00
54	Coconut shell	25	1	879	0.38		64.20	4.02	6.16		Pyrolytic carbonization	3.68
		25	1	1135	0.62		70.50	3.38	4.83			4.04
		25	1	1850	0.87		69.80	3.00	4.31			4.16
		25	1	1562	0.75		69.00	2.69	3.84			3.79
		25	1	1483	0.66		70.00	2.67	4.56			4.26
		25	1	1487	0.79		71.20	2.45	3.59			4.22

		25	1	2322	1.06		74.10	2.80	3.19			4.10
		25	1	2521	1.34		75.80	2.48	2.40			3.72
		25	1	2349	0.99		77.30	2.03	2.22			4.22
		25	1	1967	0.94		79.20	2.22	1.81			4.09
		25	1	2690	1.19		78.30	2.46	1.70			3.96
		25	1	2599	1.33		80.70	2.11	1.21			3.44
55	Argan hard shell	0	1	2251	1.04	0.93	85.08	0	9.49	5.43	Chemical activation	5.51
		25	1	1890	0.87	0.8	82.68	0	13.9	3.42		5.63
		25	1	1463	0.74	0.58	67.74	0	9.07	23.19		3.64
		25	1	1827	0.96	0.73	82.14	0	12.61	5.25		3.73
56	Longan shells	0	1	1529	0.98						Pyrolytic carbonization	3.20
		0	1	2209	1.30							4.30
		0	1	3260	2.60							5.60
		0	1	2734	2.30							4.80
57	Black gram	25	1	956	0.48	0.31	76.95	2.39	4.82		Pyrolytic carbonization	3.34
		0	1	956	0.48	0.31	76.95	2.39	4.82			4.61
		25	1	1258	0.61	0.40	83.63	2.90	4.21			3.46
		0	1	1258	0.61	0.40	83.63	2.90	4.21			5.30
		25	1	1697	0.82	0.37	84.08	2.06	3.86			3.46
		0	1	1697	0.82	0.37	84.08	2.06	3.86			5.25
		25	1	1987	1.02	0.26	89.43	1.41	1.78			2.76
		0	1	1987	1.02	0.26	89.43	1.41	1.78			5.10
		25	1	990	0.42	0.31	79.99	2.90	4.76			3.25
		0	1	990	0.42	0.31	79.99	2.90	4.76			4.65
		25	1	1428	0.65	0.29	78.36	2.58	4.38			3.06
		0	1	1428	0.65	0.29	78.36	2.58	4.38			4.97
		25	1	167	0.96	0.06	75.76	2.51	3.67			2.28
		0	1	167	0.96	0.06	75.76	2.51	3.67			3.90
		25	1	2086	1.08	0.16	91.38	1.06	2.52			2.59
		0	1	2086	1.08	0.16	91.38	1.06	2.52			4.69
		25	1	1216	0.53	0.35	78.46	2.21	5.34			3.16

		0	1	1216	0.53	0.35	78.46	2.21	5.34			4.82
		25	1	1446	0.63	0.37	81.60	2.41	4.15			3.21
		0	1	1446	0.63	0.37	81.60	2.41	4.15			5.15
		25	1	1952	1.11	0.04	71.34	3.40	3.15			2.14
		0	1	1952	1.11	0.04	71.34	3.40	3.15			3.73
		25	1	2305	1.23	0.13	79.17	2.13	1.81			2.34
		0	1	2305	1.23	0.13	79.17	2.13	1.81			4.79
58	Oil residue	25	1	660	0.42	0.33	57.89	2.71	4.31		Pyrolytic carbonization	2.04
		25	1	846	0.94	0.40	56.50	2.52	4.59			2.11
		25	1	1176	0.72	0.57	60.87	3.01	5.83			2.19
		25	1	2113	1.24	0.94	61.07	1.98	6.90			3.51
		25	1	1508	0.94	0.68	62.98	2.10	6.02			3.42
		25	1	2148	1.32	0.94	64.49	1.70	5.57			2.98
59	Biomass glucose	25	1	748	0.47	0.27	83.84	0.04	1.10	15.02	Pyrolytic carbonization	2.55
		25	1	697	0.46	0.25	75.15	0.05	6.50	18.30		2.92
		25	1	581	0.35	0.21	67.78	1.14	11.48	19.50		3.03
60	Poplar catkins	25	1	1361.9	0.58	0.46	87.23	1.62	1.89	9.26	Pyrolytic carbonization	3.55
		25	1	1005.4	0.41	0.34	87.42	1.32	2.37	8.89		3.75
		25	1	1455.1	0.68	0.47	88.57	0.89	2.89	7.65		4.05
		25	1	1248.7	0.50	0.41	89.74	0.78	2.16	7.32		2.62
		25	1	1272.4	0.55	0.43	89.23	0.82	2.09	7.86		3.35
61	d-glucose	25	1	821	0.42		65.54	2.14	12.17		Pyrolytic carbonization	3.99
		0	1	821	0.42		65.54	2.14	12.17			5.33
		25	1	1267	0.54		64.89	2.15	11.93			4.24
		0	1	1267	0.54		64.89	2.15	11.93			6.23
		25	1	1398	0.60		63.54	2.16	11.67			4.02
		0	1	1398	0.60		63.54	2.16	11.67			6.11
		25	1	1412	0.63		62.21	2.12	11.23			3.93
		0	1	1412	0.63		62.21	2.12	11.23			5.90
		25	1	1734	0.78		75.01	1.41	9.24			4.26
		0	1	1734	0.78		75.01	1.41	9.24			6.70

		25	1	1960	0.90		74.32	1.35	8.56			4.23
		0	1	1960	0.90		74.32	1.35	8.56			6.14
		25	1	2167	0.96		72.68	1.37	7.23			4.21
		0	1	2167	0.96		72.68	1.37	7.23			6.28
		25	1	2016	0.94		75.35	1.17	6.85			4.07
		0	1	2016	0.94		75.35	1.17	6.85			6.11
		25	1	2394	1.13		81.51	0.89	6.94			3.92
		0	1	2394	1.13		81.51	0.89	6.94			6.46
		25	1	2659	1.32		79.12	0.75	6.72			3.71
		0	1	2659	1.32		79.12	0.75	6.72			5.73
		25	1	2655	1.40		77.05	0.85	6.43			3.51
		0	1	2655	1.40		77.05	0.85	6.43			5.36
		25	1	2470	1.30		76.92	0.96	6.20			3.42
		0	1	2470	1.30		76.92	0.96	6.20			5.24
62	d-glucose	25	1	1210	0.69		74.30		9.80		Chemical activation	4.18
		25	1	1780	1.35		82.50		6.94			4.66
		25	1	2136	1.43		80.80		6.84			3.89
		25	1	3247	3.09		86.90		2.07			4.95
63	d-glucose	25	1	933	0.45		66.51	2.33	12.27		Pyrolytic carbonization	3.43
		0	1	933	0.45		66.51	2.33	12.27			4.80
		25	1	1005	0.46		65.31	2.38	12.21			3.46
		0	1	1005	0.46		65.31	2.38	12.21			4.84
		25	1	1170	0.53		63.67	2.42	11.81			3.74
		0	1	1170	0.53		63.67	2.42	11.81			5.32
		25	1	1754	0.83		69.83	2.14	10.51			3.69
		0	1	1754	0.83		69.83	2.14	10.51			5.45
		25	1	1699	0.89		70.32	1.98	9.54			3.65
		0	1	1699	0.89		70.32	1.98	9.54			5.87
		25	1	1824	0.92		71.66	1.97	7.74			3.92
		0	1	1824	0.92		71.66	1.97	7.74			6.23
		25	1	2572	1.43		77.70	1.56	6.57			3.75

		0	1	2572	1.43		77.70	1.56	6.57			6.23
		25	1	2510	1.54		80.32	1.73	5.03			3.56
		0	1	2510	1.54		80.32	1.73	5.03			6.16
		25	1	2827	1.55		84.24	1.65	4.69			3.16
		0	1	2827	1.55		84.24	1.65	4.69			6.05
62	d-glucose	25	1	1210	0.69		74.30		9.80		Pyrolytic carbonization	4.18
		0	1	1210	0.69		74.30		9.80			6.11
		25	1	1780	1.35		82.50		6.94			4.66
		0	1	1780	1.35		82.50		6.94			7.77
		25	1	2136	1.43		80.80		6.84			3.89
		0	1	2136	1.43		80.80		6.84			7.43
		25	1	3247	3.09		86.90		2.07			4.95
		0	1	3247	3.09		86.90		2.07			8.07
20	Glucose	25	1	1082	0.58	0.44			9.44	12.65	Hydrothermal carbonization	3.78
		0	1	1082	0.58	0.44			9.44	12.65		5.36
		25	0.15	1082	0.58	0.44			9.44	12.65		1.29
		25	1	1793	0.87	0.73			8.02	10.86		5.01
		0	1	1793	0.87	0.73			8.02	10.86		7.60
		25	0.15	1793	0.87	0.73			8.02	10.86		1.38
		25	1	2328	1.11	0.94			5.05	10.04		4.32
		0	1	2328	1.11	0.94			5.05	10.04		7.18
		25	0.15	2328	1.11	0.94			5.05	10.04		0.93
		25	1	2958	1.61	1.16			2.73	4.47		3.36
		0	1	2958	1.61	1.16			2.73	4.47		6.24
		25	0.15	2958	1.61	1.16			2.73	4.47		0.65
64	Lignin	25	1	3020	1.89		80.03		0.62	19.34	Pyrolytic carbonization	2.20
		25	*1*	3064	1.56		87.10		0.64	12.26		2.50
		25	*1*	3021	1.58		89.55		1.10	9.35		2.60
		25	*1*	2473	1.26		87.81		1.17	11.02		2.70
65	Lignin	25	1	1788	0.91	0.49	40.40		5.60	54.00	Pyrolytic carbonization	4.80
		0	1	1788	0.91	0.49	40.40		5.60	54.00		8.20

		25	1	2957	1.79	0.56	89.50		2.50	38.00		4.40
		0	1	2957	1.79	0.56	89.50		2.50	38.00		7.60
		25	1	1075	0.75	0.21	64.00		2.20	33.80		4.00
		0	1	1075	0.75	0.21	64.00		2.20	33.80		6.50
66	De-alkaline lignin	25	1	2922	1.36	1.22					Chemical activation	5.12
		25	1	2779	1.39	1.10						5.48
		25	1	1631	0.83	0.60						4.23
67	Sugarcane bagasse	25	1	32	0.02		83.16	1.74	3.81		Chemical activation	1.94
		25	1	851	0.44		87.00	0.97	0.83			4.52
		25	1	927	0.48		83.26	1.17	1.7			4.60
		25	1	1113	0.57		83.59	1.18	1.98			4.80
		25	1	1024	0.53		83.02	1.16	1.98			4.76
		25	1	945	0.49		84.19	1.12	1.99			4.71
68	Lotus stalks	25	1	848	0.38		67.03	2..34	3.77		Pyrolytic carbonization	3.39
		25	1	1164	0.54		68.32	2.55	4.01			3.67
		25	1	1087	0.52		67.65	2.25	4.50			3.22
		25	1	1105	0.49		70.25	2.12	3.21			3.69
		25	1	2053	0.97		71.37	2.04	3.64			3.47
		25	1	1921	1.04		70.98	2.06	4.03			3.12
		25	1	1113	0.48		73.56	2.09	2.61			3.88
		25	1	2264	1.34		74.32	1.97	3.08			3.51
		25	1	1824	1.03		74.98	1.88	3.45			3.45
69	Commercial phenolic resins	25	1	735	0.31		77.70	2.58	2.72		Pyrolytic carbonization	3.32
		25	1	936	0.39		78.36	2.29	4.56			4.12
		25	1	1115	0.46		79.36	2.43	5.36			4.14
		25	1	1003	0.41		79.11	2.16	6.05			3.83
		25	1	787	0.33		80.60	2.42	1.56			3.86
		25	1	1088	0.45		79.32	2.36	3.90			4.06
		25	1	1432	0.59		78.62	1.76	4.25			4.64
		25	1	1569	0.64		77.65	2.24	5.94			4.40
		25	1	932	0.39		85.36	1.95	1.39			4.03

		25	1	1288	0.54		83.69	1.70	3.85			4.61
		25	1	1924	0.79		81.34	1.64	4.09			4.57
		25	1	2155	0.94		76.96	1.29	5.74			4.38
70	Biomass canes	25	1	18	0.02		80.03		13.53	5.76	Chemical activation	1.50
		25	1	982	0.62		79.26		8.12	11.89		2.20
		25	1	582	0.29		74.73		15.88	7.28		2.10
71	Pigskin	25	1	1165	1.03		64.70	1.50	10.40	23.25	Chemical activation	4.40
		0	1	1165	1.03		64.70	1.50	10.40	23.25		5.30
		25	1	2693	1.68		84.80	0.50	6.20	8.21		3.10
		0	1	2693	1.68		84.80	0.50	6.20	8.21		4.70
		25	1	2731	1.89		86.80	1.80	2.60	7.90		2.50
		0	1	2731	1.89		86.80	1.80	2.60	7.90		4.10
		25	1	2799	1.91		91.90	1.20	1.60	4.45		2.20
		0	1	2799	1.91		91.90	1.20	1.60	4.45		4.00
72	Chitosan	25	1	667	0.29	0.28	63.30	2.40	6.50		Pyrolytic carbonization	3.74
		25	0.15	667	0.29	0.28	63.30	2.40	6.50			1.46
		25	1	716	0.32	0.31	61.50	2.50	6.60			4.04
		25	0.15	716	0.32	0.31	61.50	2.50	6.60			1.57
		25	1	718	0.33	0.31	59.10	2.30	6.80			4.17
		25	0.15	718	0.33	0.31	59.10	2.30	6.80			1.86
		25	1	907	0.40	0.39	57.90	2.60	6.70			4.26
		25	0.15	907	0.40	0.39	57.90	2.60	6.70			1.77
73	Rotten strawberries	25	1	935	0.42		72.21	2.55	3.68		Pyrolytic carbonization	3.63
		25	1	1441	0.60		68.99	2.21	5.16			4.04
		25	1	1117	0.52		78.02	2.44	5.38			4.49
		25	1	1482	0.64		70.16	3.06	5.06			3.87
		25	1	1408	0.67		76.23	2.39	3.81			3.73
		25	1	1577	0.68		79.18	2.11	2.60			3.99
74	Soya chunks	25	1	607					4.30		Pyrolytic carbonization	2.70
		25	1	1072					5.30			3.20
	Arundo donax	25	1	1863	1.00				5.40			2.10

75		25	1	1340	0.68				4.05		Chemical activation	1.70
		25	1	1420	0.76				3.50			2.00
76	Waste wool	25	1	447	0.22	0.18	71.90	1.37	11.25	15.48	Pyrolytic carbonization	1.48
		25	1	1010	0.57	0.37	70.73	1.64	4.57	23.06		2.33
		25	1	1352	0.78	0.54	69.65	1.42	4.14	24.79		2.78
77	Fallen leaves	25	1	1210	0.48	0.39	84.80		1.70		Pyrolytic carbonization	3.39
		25	0.15	1210	0.48	0.39	84.80		1.70			1.20
		25	1	1360	0.51	0.40	81.30		1.00			4.09
		25	0.15	1360	0.51	0.40	81.30		1.00			1.55
		25	1	1600	0.65	0.54	84.40		1.30			4.41
		25	0.15	1600	0.65	0.54	84.40		1.30			1.41
		25	1	1630	0.66	0.56	85.50		2.50			4.20
		25	0.15	1630	0.66	0.56	85.50		2.50			1.14
		25	1	2230	1.03	0.89	86.50		0.40			3.93
		25	0.15	2230	1.03	0.89	86.50		0.40			0.98
		25	1	1950	0.88	0.72	84.80		0.40			4.23
		25	0.15	1950	0.88	0.72	84.80		0.40			1.14
3	Coffee grounds (Nespresso)	0	1	0.8	0.01	<0.01			0.41	0.8	Pyrolytic carbonization	0.41
		0	1	22	0.12	<0.01			0.46	22		0.46
78	Stem bark	25	1	1393	0.63	0.49	87.48		1.61	10.91	Pyrolytic carbonization	3.92
		25	1	1759	0.92	0.60	89.48		1.43	9.09		4.45
		25	1	1229	0.89	0.15	92.59		0.99	6.42		3.76
33	Black locust	25	1	2511	1.35	1.16	76.38	1.48	7.21		Pyrolytic carbonization	5.05
		0	1	2511	1.35	1.16	76.38	1.48	7.21			7.19
		25	0.15	2511	1.35	1.16	76.38	1.48	7.21			1.59
79	Banana peel	25	1	1426.1	0.83	0.56	43.50	2.20	4.20		Pyrolytic carbonization	2.70
80	Coca cola	25	1	1082	0.43		69.60		3.30	13.80	Chemical activation	3.20
		25	1	1994	0.87		73.10		4.20	10.30		3.08
		25	1	1405	0.80		74.00		3.50	12.50		5.22

81	Human hair	0	1	1230	0.90						Chemical activation	5.14
		0	1	2380	1.64							5.45
		0	1	2700	1.33							4.27

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18 ***Table S2.*** *Synthesis of carbon porous materials under different conditions.*

Reference	Ultimate analysis(%)						H/C	O/C	T(℃)	Z
	C	H	O	N	S	Ash				
82	47.6	6.76	44.51	1.13	0	1.24	1.69	0.70	231.85	0.05
	47.6	6.76	44.51	1.13	0	1.24	1.69	0.70	257.85	0.1
	47.6	6.76	44.51	1.13	0	1.24	1.69	0.70	269.85	0.15
	47.6	6.76	44.51	1.13	0	1.24	1.69	0.70	281.85	0.2
	47.6	6.76	44.51	1.13	0	1.24	1.69	0.70	290.85	0.25
	47.6	6.76	44.51	1.13	0	1.24	1.69	0.70	297.85	0.3
	47.6	6.76	44.51	1.13	0	1.24	1.69	0.70	304.85	0.35
	47.6	6.76	44.51	1.13	0	1.24	1.69	0.70	310.85	0.4
	47.6	6.76	44.51	1.13	0	1.24	1.69	0.70	317.85	0.45
	47.6	6.76	44.51	1.13	0	1.24	1.69	0.70	324.85	0.5
	47.6	6.76	44.51	1.13	0	1.24	1.69	0.70	332.85	0.55
	47.6	6.76	44.51	1.13	0	1.24	1.69	0.70	335.85	0.6
	47.6	6.76	44.51	1.13	0	1.24	1.69	0.70	343.85	0.65
	47.6	6.76	44.51	1.13	0	1.24	1.69	0.70	347.85	0.7
	47.6	6.76	44.51	1.13	0	1.24	1.69	0.70	351.85	0.75
	47.6	6.76	44.51	1.13	0	1.24	1.69	0.70	354.85	0.8
	47.6	6.76	44.51	1.13	0	1.24	1.69	0.70	358.85	0.85
	47.6	6.76	44.51	1.13	0	1.24	1.69	0.70	362.85	0.9
	47.6	6.76	44.51	1.13	0	1.24	1.69	0.70	371.85	0.95
83	44.19	6.3	48.74	0.74	0	6.68	1.7	0.83	253.85	0.05
	44.19	6.3	48.74	0.74	0	6.68	1.7	0.83	272.85	0.1
	44.19	6.3	48.74	0.74	0	6.68	1.7	0.83	284.85	0.15

	44.19	6.3	48.74	0.74	0	6.68	1.7	0.83	294.85	0.2
	44.19	6.3	48.74	0.74	0	6.68	1.7	0.83	303.85	0.25
	44.19	6.3	48.74	0.74	0	6.68	1.7	0.83	311.85	0.3
	44.19	6.3	48.74	0.74	0	6.68	1.7	0.83	318.85	0.35
	44.19	6.3	48.74	0.74	0	6.68	1.7	0.83	325.85	0.4
	44.19	6.3	48.74	0.74	0	6.68	1.7	0.83	331.85	0.45
	44.19	6.3	48.74	0.74	0	6.68	1.7	0.83	336.85	0.5
	44.19	6.3	48.74	0.74	0	6.68	1.7	0.83	341.85	0.55
	44.19	6.3	48.74	0.74	0	6.68	1.7	0.83	345.85	0.6
	44.19	6.3	48.74	0.74	0	6.68	1.7	0.83	350.85	0.65
	44.19	6.3	48.74	0.74	0	6.68	1.7	0.83	356.85	0.7
	44.19	6.3	48.74	0.74	0	6.68	1.7	0.83	394.85	0.8
84	46.27	6.43	46.8	0.46	0	1	1.66	0.76	295.85	0.2
	46.27	6.43	46.8	0.46	0.05	1	1.66	0.76	302.85	0.25
	46.27	6.43	46.8	0.46	0.05	1	1.66	0.76	310.85	0.3
	46.27	6.43	46.8	0.46	0.05	1	1.66	0.76	317.85	0.35
	46.27	6.43	46.8	0.46	0.05	1	1.66	0.76	325.85	0.4
	46.27	6.43	46.8	0.46	0.05	1	1.66	0.76	332.85	0.45
	46.27	6.43	46.8	0.46	0.05	1	1.66	0.76	340.85	0.5
	46.27	6.43	46.8	0.46	0.05	1	1.66	0.76	347.85	0.55
	46.27	6.43	46.8	0.46	0.05	1	1.66	0.76	353.85	0.6
	46.27	6.43	46.8	0.46	0.05	1	1.66	0.76	360.85	0.65
	46.27	6.43	46.8	0.46	0.05	1	1.66	0.76	364.85	0.7
	46.27	6.43	46.8	0.46	0.05	1	1.66	0.76	368.85	0.75
	46.27	6.43	46.8	0.46	0.05	1	1.66	0.76	373.85	0.8
85	47.19	6.02	46.66	0.08	0.05	2.56	1.52	0.74	236.85	0.05
	47.19	6.02	46.66	0.08	0.05	2.56	1.52	0.74	266.85	0.1
	47.19	6.02	46.66	0.08	0.05	2.56	1.52	0.74	285.85	0.15
	47.19	6.02	46.66	0.08	0.05	2.56	1.52	0.74	301.85	0.2
	47.19	6.02	46.66	0.08	0.05	2.56	1.52	0.74	312.85	0.25
	47.19	6.02	46.66	0.08	0.05	2.56	1.52	0.74	324.85	0.3

	47.19	6.02	46.66	0.08	0.05	2.56	1.52	0.74	336.85	0.35
	47.19	6.02	46.66	0.08	0.05	2.56	1.52	0.74	345.85	0.4
	47.19	6.02	46.66	0.08	0.05	2.56	1.52	0.74	354.85	0.45
	47.19	6.02	46.66	0.08	0.05	2.56	1.52	0.74	360.85	0.5
	47.19	6.02	46.66	0.08	0.05	2.56	1.52	0.74	367.85	0.55
	47.19	6.02	46.66	0.08	0.05	2.56	1.52	0.74	374.85	0.6
	47.19	6.02	46.66	0.08	0.05	2.56	1.52	0.74	380.85	0.65
	47.19	6.02	46.66	0.08	0.05	2.56	1.52	0.74	387.85	0.7
	47.19	6.02	46.66	0.08	0.05	2.56	1.52	0.74	397.85	0.75
	47.19	6.02	46.66	0.08	0.05	2.56	1.52	0.74	413.85	0.8
86	50.12	7.98	38.89	3.01	0	2.2	1.9	0.58	261.85	0.1
	50.12	7.98	38.89	3.01	0	2.2	1.9	0.58	286.85	0.2
	50.12	7.98	38.89	3.01	0	2.2	1.9	0.58	310.85	0.3
	50.12	7.98	38.89	3.01	0	2.2	1.9	0.58	329.85	0.4
	50.12	7.98	38.89	3.01	0	2.2	1.9	0.58	347.85	0.5
	50.12	7.98	38.89	3.01	0	2.2	1.9	0.58	381.85	0.6
	50.12	7.98	38.89	3.01	0	2.2	1.9	0.58	397.85	0.7
	52.12	5.86	36.42	5.1	0.5	3.02	1.34	0.52	242.85	0.1
	52.12	5.86	36.42	5.1	0.5	3.02	1.34	0.52	284.85	0.2
	52.12	5.86	36.42	5.1	0.5	3.02	1.34	0.52	315.85	0.3
	52.12	5.86	36.42	5.1	0.5	3.02	1.34	0.52	344.85	0.4
	52.12	5.86	36.42	5.1	0.5	3.02	1.34	0.52	368.85	0.5
	52.12	5.86	36.42	5.1	0.5	3.02	1.34	0.52	382.85	0.6
	52.12	5.86	36.42	5.1	0.5	3.02	1.34	0.52	403.85	0.7
	52.12	5.86	36.42	5.1	0.5	3.02	1.34	0.52	447.85	0.8
	55.02	8.12	33.21	3.12	0.53	3.15	1.76	0.45	268.85	0.1
	55.02	8.12	33.21	3.12	0.53	3.15	1.76	0.45	325.85	0.2
	55.02	8.12	33.21	3.12	0.53	3.15	1.76	0.45	360.85	0.3
	55.02	8.12	33.21	3.12	0.53	3.15	1.76	0.45	383.85	0.4
	55.02	8.12	33.21	3.12	0.53	3.15	1.76	0.45	399.85	0.5
	55.02	8.12	33.21	3.12	0.53	3.15	1.76	0.45	413.85	0.6

	55.02	8.12	33.21	3.12	0.53	3.15	1.76	0.45	424.85	0.7
	55.02	8.12	33.21	3.12	0.53	3.15	1.76	0.45	438.85	0.8
87	46.54	6.49	44.92	1.71	0.34	2.28	1.66	0.72	270.85	0.05
	46.54	6.49	44.92	1.71	0.34	2.28	1.66	0.72	294.85	0.1
	46.54	6.49	44.92	1.71	0.34	2.28	1.66	0.72	311.85	0.15
	46.54	6.49	44.92	1.71	0.34	2.28	1.66	0.72	326.85	0.2
	46.54	6.49	44.92	1.71	0.34	2.28	1.66	0.72	337.85	0.25
	46.54	6.49	44.92	1.71	0.34	2.28	1.66	0.72	347.85	0.3
	46.54	6.49	44.92	1.71	0.34	2.28	1.66	0.72	357.85	0.35
	46.54	6.49	44.92	1.71	0.34	2.28	1.66	0.72	364.85	0.4
	46.54	6.49	44.92	1.71	0.34	2.28	1.66	0.72	370.85	0.45
	46.54	6.49	44.92	1.71	0.34	2.28	1.66	0.72	375.85	0.5
	46.54	6.49	44.92	1.71	0.34	2.28	1.66	0.72	381.85	0.55
	46.54	6.49	44.92	1.71	0.34	2.28	1.66	0.72	385.85	0.6
	46.54	6.49	44.92	1.71	0.34	2.28	1.66	0.72	390.85	0.65
	46.54	6.49	44.92	1.71	0.34	2.28	1.66	0.72	395.85	0.7
	46.54	6.49	44.92	1.71	0.34	2.28	1.66	0.72	405.85	0.75
	46.54	6.49	44.92	1.71	0.34	2.28	1.66	0.72	431.85	0.8
	46.54	6.49	44.92	1.71	0.34	2.28	1.66	0.72	469.85	0.85
	46.54	6.49	44.92	1.71	0.34	2.28	1.66	0.72	516.85	0.9
	46.54	6.49	44.92	1.71	0.34	2.28	1.66	0.72	580.85	0.95
88	43.8	6.7	49.4	0	0.1	17.5	1.82	0.85	278.85	0.1
	43.8	6.7	49.4	0	0.1	17.5	1.82	0.85	301.85	0.2
	43.8	6.7	49.4	0	0.1	17.5	1.82	0.85	317.85	0.3
	43.8	6.7	49.4	0	0.1	17.5	1.82	0.85	328.85	0.4
	43.8	6.7	49.4	0	0.1	17.5	1.82	0.85	337.85	0.5
	43.8	6.7	49.4	0	0.1	17.5	1.82	0.85	344.85	0.6
	43.8	6.7	49.4	0	0.1	17.5	1.82	0.85	351.85	0.7
	43.8	6.7	49.4	0	0.1	17.5	1.82	0.85	358.85	0.8
	43.8	6.7	49.4	0	0.1	17.5	1.82	0.85	371.85	0.9
	45.8	6.9	37.7	0.4	0	9.5	1.8	0.62	281.85	0.1

	45.8	6.9	37.7	0.4	0	9.5	1.8	0.62	302.85	0.2
	45.8	6.9	37.7	0.4	0	9.5	1.8	0.62	319.85	0.3
	45.8	6.9	37.7	0.4	0	9.5	1.8	0.62	334.85	0.4
	45.8	6.9	37.7	0.4	0	9.5	1.8	0.62	349.85	0.5
	45.8	6.9	37.7	0.4	0	9.5	1.8	0.62	364.85	0.6
	45.8	6.9	37.7	0.4	0	9.5	1.8	0.62	373.85	0.7
	45.8	6.9	37.7	0.4	0	9.5	1.8	0.62	382.85	0.8
	45.8	6.9	37.7	0.4	0	9.5	1.8	0.62	391.85	0.9
	37.8	6.3	40.3	0	0.1	15.5	1.99	0.8	266.85	0.1
	37.8	6.3	40.3	0	0.1	15.5	1.99	0.8	292.85	0.2
	37.8	6.3	40.3	0	0.1	15.5	1.99	0.8	308.85	0.3
	37.8	6.3	40.3	0	0.1	15.5	1.99	0.8	319.85	0.4
	37.8	6.3	40.3	0	0.1	15.5	1.99	0.8	330.85	0.5
	37.8	6.3	40.3	0	0.1	15.5	1.99	0.8	338.85	0.6
	37.8	6.3	40.3	0	0.1	15.5	1.99	0.8	345.85	0.7
	37.8	6.3	40.3	0	0.1	15.5	1.99	0.8	354.85	0.8
	37.8	6.3	40.3	0	0.1	15.5	1.99	0.8	373.85	0.9
89	43.2	6.92	49.55	0.14	0.19	10.3	1.91	0.86	233.85	0.1
	43.2	6.92	49.55	0.14	0.19	10.3	1.91	0.86	286.85	0.2
	43.2	6.92	49.55	0.14	0.19	10.3	1.91	0.86	311.85	0.3
	43.2	6.92	49.55	0.14	0.19	10.3	1.91	0.86	330.85	0.4
	43.2	6.92	49.55	0.14	0.19	10.3	1.91	0.86	347.85	0.5
	43.2	6.92	49.55	0.14	0.19	10.3	1.91	0.86	359.85	0.6
	43.2	6.92	49.55	0.14	0.19	10.3	1.91	0.86	368.85	0.7
	43.2	6.92	49.55	0.14	0.19	10.3	1.91	0.86	378.85	0.8
	43.2	6.92	49.55	0.14	0.19	10.3	1.91	0.86	449.85	0.9
90	43.94	6.08	47.2	2.78	0	8.75	1.65	0.81	265.85	0.1
	43.94	6.08	47.2	2.78	0	8.75	1.65	0.81	274.85	0.2
	43.94	6.08	47.2	2.78	0	8.75	1.65	0.81	280.85	0.3
	43.94	6.08	47.2	2.78	0	8.75	1.65	0.81	285.85	0.4
	43.94	6.08	47.2	2.78	0	8.75	1.65	0.81	290.85	0.5

	43.94	6.08	47.2	2.78	0	8.75	1.65	0.81	295.85	0.6
	43.94	6.08	47.2	2.78	0	8.75	1.65	0.81	301.85	0.7
	43.94	6.08	47.2	2.78	0	8.75	1.65	0.81	307.85	0.8
	43.94	6.08	47.2	2.78	0	8.75	1.65	0.81	315.85	0.9
91	48.19	6.46	45.15	0.11	0.09	3.2	1.6	0.7	256.85	0.05
	48.19	6.46	45.15	0.11	0.09	3.2	1.6	0.7	274.85	0.1
	48.19	6.46	45.15	0.11	0.09	3.2	1.6	0.7	285.85	0.15
	48.19	6.46	45.15	0.11	0.09	3.2	1.6	0.7	293.85	0.2
	48.19	6.46	45.15	0.11	0.09	3.2	1.6	0.7	301.85	0.25
	48.19	6.46	45.15	0.11	0.09	3.2	1.6	0.7	308.85	0.3
	48.19	6.46	45.15	0.11	0.09	3.2	1.6	0.7	315.85	0.35
	48.19	6.46	45.15	0.11	0.09	3.2	1.6	0.7	321.85	0.4
	48.19	6.46	45.15	0.11	0.09	3.2	1.6	0.7	327.85	0.45
	48.19	6.46	45.15	0.11	0.09	3.2	1.6	0.7	332.85	0.5
	48.19	6.46	45.15	0.11	0.09	3.2	1.6	0.7	336.85	0.55
	48.19	6.46	45.15	0.11	0.09	3.2	1.6	0.7	340.85	0.6
	48.19	6.46	45.15	0.11	0.09	3.2	1.6	0.7	343.85	0.65
	48.19	6.46	45.15	0.11	0.09	3.2	1.6	0.7	345.85	0.7
	48.19	6.46	45.15	0.11	0.09	3.2	1.6	0.7	348.85	0.75
	48.19	6.46	45.15	0.11	0.09	3.2	1.6	0.7	352.85	0.8
	48.19	6.46	45.15	0.11	0.09	3.2	1.6	0.7	356.85	0.85
	48.19	6.46	45.15	0.11	0.09	3.2	1.6	0.7	359.85	0.9
	48.19	6.46	45.15	0.11	0.09	3.2	1.6	0.7	364.85	0.95
92	49.38	5.23	44.76	0.5	0	1.3	1.26	0.68	342.85	0.2
	49.38	5.23	44.76	0.5	0	1.3	1.26	0.68	370.85	0.3
	49.38	5.23	44.76	0.5	0	1.3	1.26	0.68	405.85	0.4
	49.38	5.23	44.76	0.5	0	1.3	1.26	0.68	432.85	0.5
	49.38	5.23	44.76	0.5	0	1.3	1.26	0.68	451.85	0.6
	49.38	5.23	44.76	0.5	0	1.3	1.26	0.68	544.85	0.7
	49.38	5.23	44.76	0.5	0	1.3	1.26	0.68	640.85	0.8
	44.28	6.835	47.32	1.279	0.29	6.26	1.84	0.8	274.85	0.1

93	44.28	6.835	47.32	1.279	0.29	6.26	1.84	0.8	283.85	0.2
	44.28	6.835	47.32	1.279	0.29	6.26	1.84	0.8	297.85	0.3
	44.28	6.835	47.32	1.279	0.29	6.26	1.84	0.8	310.85	0.4
	44.28	6.835	47.32	1.279	0.29	6.26	1.84	0.8	320.85	0.5
	44.28	6.835	47.32	1.279	0.29	6.26	1.84	0.8	331.85	0.6
	44.28	6.835	47.32	1.279	0.29	6.26	1.84	0.8	356.85	0.7
	44.28	6.835	47.32	1.279	0.29	6.26	1.84	0.8	405.85	0.8
94	38.94	5.34	54.45	1.02	0.25	2.6	1.63	1.05	128.85	0.1
	38.94	5.34	54.45	1.02	0.25	2.6	1.63	1.05	314.85	0.2
	38.94	5.34	54.45	1.02	0.25	2.6	1.63	1.05	339.85	0.3
	38.94	5.34	54.45	1.02	0.25	2.6	1.63	1.05	358.85	0.4
	38.94	5.34	54.45	1.02	0.25	2.6	1.63	1.05	375.85	0.5
	38.94	5.34	54.45	1.02	0.25	2.6	1.63	1.05	391.85	0.6
	38.94	5.34	54.45	1.02	0.25	2.6	1.63	1.05	421.85	0.7
95	43.91	5.87	40.03	1.47	0.1	5.67	1.59	0.68	229.85	0.1
	43.91	5.87	40.03	1.47	0.1	5.67	1.59	0.68	244.85	0.15
	43.91	5.87	40.03	1.47	0.1	5.67	1.59	0.68	261.85	0.2
	43.91	5.87	40.03	1.47	0.1	5.67	1.59	0.68	276.85	0.25
	43.91	5.87	40.03	1.47	0.1	5.67	1.59	0.68	290.85	0.3
	43.91	5.87	40.03	1.47	0.1	5.67	1.59	0.68	301.85	0.35
	43.91	5.87	40.03	1.47	0.1	5.67	1.59	0.68	309.85	0.4
	43.91	5.87	40.03	1.47	0.1	5.67	1.59	0.68	317.85	0.45
	43.91	5.87	40.03	1.47	0.1	5.67	1.59	0.68	324.85	0.5
	43.91	5.87	40.03	1.47	0.1	5.67	1.59	0.68	328.85	0.55
	43.91	5.87	40.03	1.47	0.1	5.67	1.59	0.68	333.85	0.6
	43.91	5.87	40.03	1.47	0.1	5.67	1.59	0.68	338.85	0.65
	43.91	5.87	40.03	1.47	0.1	5.67	1.59	0.68	343.85	0.7
	43.91	5.87	40.03	1.47	0.1	5.67	1.59	0.68	350.85	0.75
	43.91	5.87	40.03	1.47	0.1	5.67	1.59	0.68	363.85	0.8
96	42.79	5.17	32.67	2.61	0.27	3.23	1.44	0.57	234.85	0.1
	42.79	5.17	32.67	2.61	0.27	3.23	1.44	0.57	282.85	0.2

	42.79	5.17	32.67	2.61	0.27	3.23	1.44	0.57	325.85	0.3
	42.79	5.17	32.67	2.61	0.27	3.23	1.44	0.57	367.85	0.4
	42.79	5.17	32.67	2.61	0.27	3.23	1.44	0.57	408.85	0.5
	42.79	5.17	32.67	2.61	0.27	3.23	1.44	0.57	470.85	0.6
	42.79	5.17	32.67	2.61	0.27	3.23	1.44	0.57	490.85	0.7
	42.79	5.17	32.67	2.61	0.27	3.23	1.44	0.57	577.85	0.8
	42.79	5.17	32.67	2.61	0.27	3.23	1.44	0.57	659.85	0.9
97	47.23	5.14	46.87	0.77	0	6.87	1.3	0.74	227.85	0.05
	47.23	5.14	46.87	0.77	0	6.87	1.3	0.74	262.85	0.1
	47.23	5.14	46.87	0.77	0	6.87	1.3	0.74	283.85	0.15
	47.23	5.14	46.87	0.77	0	6.87	1.3	0.74	297.85	0.2
	47.23	5.14	46.87	0.77	0	6.87	1.3	0.74	309.85	0.25
	47.23	5.14	46.87	0.77	0	6.87	1.3	0.74	321.85	0.3
	47.23	5.14	46.87	0.77	0	6.87	1.3	0.74	332.85	0.35
	47.23	5.14	46.87	0.77	0	6.87	1.3	0.74	342.85	0.4
	47.23	5.14	46.87	0.77	0	6.87	1.3	0.74	351.85	0.45
	47.23	5.14	46.87	0.77	0	6.87	1.3	0.74	356.85	0.5
	47.23	5.14	46.87	0.77	0	6.87	1.3	0.74	362.85	0.55
	47.23	5.14	46.87	0.77	0	6.87	1.3	0.74	366.85	0.6
	47.23	5.14	46.87	0.77	0	6.87	1.3	0.74	370.85	0.65
	47.23	5.14	46.87	0.77	0	6.87	1.3	0.74	375.85	0.7
	47.23	5.14	46.87	0.77	0	6.87	1.3	0.74	384.85	0.75
	47.23	5.14	46.87	0.77	0	6.87	1.3	0.74	403.85	0.8
98	43.28	6.83	48.31	1.28	0.3	7.26	1.88	0.84	241.85	0.1
	43.28	6.83	48.31	1.28	0.3	7.26	1.88	0.84	314.85	0.2
	43.28	6.83	48.31	1.28	0.3	7.26	1.88	0.84	341.85	0.3
	43.28	6.83	48.31	1.28	0.3	7.26	1.88	0.84	361.85	0.4
	43.28	6.83	48.31	1.28	0.3	7.26	1.88	0.84	379.85	0.5
	43.28	6.83	48.31	1.28	0.3	7.26	1.88	0.84	401.85	0.6
	43.28	6.83	48.31	1.28	0.3	7.26	1.88	0.84	430.85	0.7
	43.28	6.83	48.31	1.28	0.3	7.26	1.88	0.84	461.85	0.8

99	43.1	5.1	51.42	0.32	0.06	10	1.41	0.9	177.85	0.1
	43.1	5.1	51.42	0.32	0.06	10	1.41	0.9	234.85	0.2
	43.1	5.1	51.42	0.32	0.06	10	1.41	0.9	273.85	0.3
	43.1	5.1	51.42	0.32	0.06	10	1.41	0.9	304.85	0.4
	43.1	5.1	51.42	0.32	0.06	10	1.41	0.9	332.85	0.5
	43.1	5.1	51.42	0.32	0.06	10	1.41	0.9	356.85	0.6
	43.1	5.1	51.42	0.32	0.06	10	1.41	0.9	371.85	0.7
	43.1	5.1	51.42	0.32	0.06	10	1.41	0.9	380.85	0.8
100	42.1	4.6	52.87	0.34	0.09	10.3	1.3	0.94	222.85	0.1
	42.1	4.6	52.87	0.34	0.09	10.3	1.3	0.94	242.85	0.2
	42.1	4.6	52.87	0.34	0.09	10.3	1.3	0.94	256.85	0.3
	42.1	4.6	52.87	0.34	0.09	10.3	1.3	0.94	270.85	0.4
	42.1	4.6	52.87	0.34	0.09	10.3	1.3	0.94	285.85	0.5
	42.1	4.6	52.87	0.34	0.09	10.3	1.3	0.94	296.85	0.6
	42.1	4.6	52.87	0.34	0.09	10.3	1.3	0.94	305.85	0.7
	42.1	4.6	52.87	0.34	0.09	10.3	1.3	0.94	312.85	0.8
101	55	7.9	34	2.8	0.3	4.87	1.71	0.46	232.85	0.2
	55	7.9	34	2.8	0.3	4.87	1.71	0.46	259.85	0.2
	55	7.9	34	2.8	0.3	4.87	1.71	0.46	278.85	0.3
	55	7.9	34	2.8	0.3	4.87	1.71	0.46	305.85	0.3
	55	7.9	34	2.8	0.3	4.87	1.71	0.46	323.85	0.4
	55	7.9	34	2.8	0.3	4.87	1.71	0.46	350.85	0.4
	55	7.9	34	2.8	0.3	4.87	1.71	0.46	378.85	0.5
	55	7.9	34	2.8	0.3	4.87	1.71	0.46	404.85	0.5
	55	7.9	34	2.8	0.3	4.87	1.71	0.46	423.85	0.6
	55	7.9	34	2.8	0.3	4.87	1.71	0.46	450.85	0.6
	55	7.9	34	2.8	0.3	4.87	1.71	0.46	477.85	0.7
	55	7.9	34	2.8	0.3	4.87	1.71	0.46	505.85	0.7
102	44.93	6.43	45.55	2.67	0.42	10.83	1.71	0.76	212.85	0.1
	44.93	6.43	45.55	2.67	0.42	10.83	1.71	0.76	259.85	0.2
	44.93	6.43	45.55	2.67	0.42	10.83	1.71	0.76	284.85	0.3

	44.93	6.43	45.55	2.67	0.42	10.83	1.71	0.76	305.85	0.4
	44.93	6.43	45.55	2.67	0.42	10.83	1.71	0.76	326.85	0.5
	44.93	6.43	45.55	2.67	0.42	10.83	1.71	0.76	367.85	0.6
	44.93	6.43	45.55	2.67	0.42	10.83	1.71	0.76	434.85	0.7
	44.93	6.43	45.55	2.67	0.42	10.83	1.71	0.76	478.85	0.8
	44.93	6.43	45.55	2.67	0.42	10.83	1.71	0.76	522.85	0.9
103	48.33	6.01	45.33	0.34	0	0.61	1.48	0.7	286.85	0.2
	48.33	6.01	45.33	0.34	0	0.61	1.48	0.7	302.85	0.3
	48.33	6.01	45.33	0.34	0	0.61	1.48	0.7	317.85	0.4
	48.33	6.01	45.33	0.34	0	0.61	1.48	0.7	329.85	0.5
	48.33	6.01	45.33	0.34	0	0.61	1.48	0.7	339.85	0.6
	48.33	6.01	45.33	0.34	0	0.61	1.48	0.7	347.85	0.7
	48.33	6.01	45.33	0.34	0	0.61	1.48	0.7	354.85	0.8
	55.52	5.42	38.58	0.52	0	1.82	1.16	0.52	330.85	0.2
	55.52	5.42	38.58	0.52	0	1.82	1.16	0.52	337.85	0.3
	55.52	5.42	38.58	0.52	0	1.82	1.16	0.52	342.85	0.4
	55.52	5.42	38.58	0.52	0	1.82	1.16	0.52	346.85	0.5
	55.52	5.42	38.58	0.52	0	1.82	1.16	0.52	350.85	0.6
	55.52	5.42	38.58	0.52	0	1.82	1.16	0.52	354.85	0.7
	55.52	5.42	38.58	0.52	0	1.82	1.16	0.52	358.85	0.8
104	45.31	5.49	48.92	0.28	0	1.97	1.44	0.81	268.85	0.1
	45.31	5.49	48.92	0.28	0	1.97	1.44	0.81	283.85	0.15
	45.31	5.49	48.92	0.28	0	1.97	1.44	0.81	292.85	0.2
	45.31	5.49	48.92	0.28	0	1.97	1.44	0.81	298.85	0.25
	45.31	5.49	48.92	0.28	0	1.97	1.44	0.81	307.85	0.3
	45.31	5.49	48.92	0.28	0	1.97	1.44	0.81	314.85	0.35
	45.31	5.49	48.92	0.28	0	1.97	1.44	0.81	320.85	0.4
	45.31	5.49	48.92	0.28	0	1.97	1.44	0.81	327.85	0.45
	45.31	5.49	48.92	0.28	0	1.97	1.44	0.81	335.85	0.5
	45.31	5.49	48.92	0.28	0	1.97	1.44	0.81	343.85	0.55
	45.31	5.49	48.92	0.28	0	1.97	1.44	0.81	350.85	0.6

	45.31	5.49	48.92	0.28	0	1.97	1.44	0.81	357.85	0.65
	45.31	5.49	48.92	0.28	0	1.97	1.44	0.81	364.85	0.7
	45.31	5.49	48.92	0.28	0	1.97	1.44	0.81	371.85	0.75
	45.31	5.49	48.92	0.28	0	1.97	1.44	0.81	386.85	0.8
105	45.95	8.75	43.6	2.12	0	5.8	2.27	0.71	273.85	0.2
	45.95	8.75	43.6	2.12	0	5.8	2.27	0.71	289.85	0.2
	45.95	8.75	43.6	2.12	0	5.8	2.27	0.71	282.85	0.25
	45.95	8.75	43.6	2.12	0	5.8	2.27	0.71	302.85	0.25
	45.95	8.75	43.6	2.12	0	5.8	2.27	0.71	289.85	0.3
	45.95	8.75	43.6	2.12	0	5.8	2.27	0.71	308.85	0.3
	45.95	8.75	43.6	2.12	0	5.8	2.27	0.71	295.85	0.35
	45.95	8.75	43.6	2.12	0	5.8	2.27	0.71	316.85	0.35
	45.95	8.75	43.6	2.12	0	5.8	2.27	0.71	302.85	0.4
	45.95	8.75	43.6	2.12	0	5.8	2.27	0.71	323.85	0.4
	45.95	8.75	43.6	2.12	0	5.8	2.27	0.71	305.85	0.45
	45.95	8.75	43.6	2.12	0	5.8	2.27	0.71	330.85	0.45
	45.95	8.75	43.6	2.12	0	5.8	2.27	0.71	315.85	0.5
	45.95	8.75	43.6	2.12	0	5.8	2.27	0.71	349.85	0.5
	45.95	8.75	43.6	2.12	0	5.8	2.27	0.71	330.85	0.55
	45.95	8.75	43.6	2.12	0	5.8	2.27	0.71	366.85	0.55
	45.95	8.75	43.6	2.12	0	5.8	2.27	0.71	354.85	0.6
	45.95	8.75	43.6	2.12	0	5.8	2.27	0.71	383.85	0.6
	45.95	8.75	43.6	2.12	0	5.8	2.27	0.71	366.85	0.65
	45.95	8.75	43.6	2.12	0	5.8	2.27	0.71	392.85	0.65
	45.95	8.75	43.6	2.12	0	5.8	2.27	0.71	387.85	0.7
	45.95	8.75	43.6	2.12	0	5.8	2.27	0.71	411.85	0.7
	45.95	8.75	43.6	2.12	0	5.8	2.27	0.71	415.85	0.75
	45.95	8.75	43.6	2.12	0	5.8	2.27	0.71	440.85	0.75
	45.95	8.75	43.6	2.12	0	5.8	2.27	0.71	435.85	0.8
	45.95	8.75	43.6	2.12	0	5.8	2.27	0.71	449.85	0.8
	46.86	6.84	44.98	1.03	0.29	6.12	1.74	0.72	243.85	0.1

106	46.86	6.84	44.98	1.03	0.29	6.12	1.74	0.72	291.85	0.2
	46.86	6.84	44.98	1.03	0.29	6.12	1.74	0.72	312.85	0.3
	46.86	6.84	44.98	1.03	0.29	6.12	1.74	0.72	329.85	0.4
	46.86	6.84	44.98	1.03	0.29	6.12	1.74	0.72	346.85	0.5
	46.86	6.84	44.98	1.03	0.29	6.12	1.74	0.72	388.85	0.6
	46.86	6.84	44.98	1.03	0.29	6.12	1.74	0.72	441.85	0.7
	46.86	6.84	44.98	1.03	0.29	6.12	1.74	0.72	484.85	0.8
	46.86	6.84	44.98	1.03	0.29	6.12	1.74	0.72	523.85	0.9
107	47.9	5.943	34.913	1.74	0.374	3.2	1.48	0.55	226.85	0.05
	47.9	5.943	34.913	1.74	0.374	3.2	1.48	0.55	247.85	0.1
	47.9	5.943	34.913	1.74	0.374	3.2	1.48	0.55	267.85	0.15
	47.9	5.943	34.913	1.74	0.374	3.2	1.48	0.55	279.85	0.2
	47.9	5.943	34.913	1.74	0.374	3.2	1.48	0.55	290.85	0.25
	47.9	5.943	34.913	1.74	0.374	3.2	1.48	0.55	297.85	0.3
	47.9	5.943	34.913	1.74	0.374	3.2	1.48	0.55	305.85	0.35
	47.9	5.943	34.913	1.74	0.374	3.2	1.48	0.55	311.85	0.4
	47.9	5.943	34.913	1.74	0.374	3.2	1.48	0.55	321.85	0.45
	47.9	5.943	34.913	1.74	0.374	3.2	1.48	0.55	330.85	0.5
	47.9	5.943	34.913	1.74	0.374	3.2	1.48	0.55	347.85	0.55
	47.9	5.943	34.913	1.74	0.374	3.2	1.48	0.55	363.85	0.6
	47.9	5.943	34.913	1.74	0.374	3.2	1.48	0.55	385.85	0.65
	47.9	5.943	34.913	1.74	0.374	3.2	1.48	0.55	404.85	0.7
	60.2	5.002	23.304	2.511	0.4	5.49	0.99	0.29	266.85	0.05
	60.2	5.002	23.304	2.511	0.4	5.49	0.99	0.29	293.85	0.05
	60.2	5.002	23.304	2.511	0.4	5.49	0.99	0.29	281.85	0.1
	60.2	5.002	23.304	2.511	0.4	5.49	0.99	0.29	310.85	0.1
	60.2	5.002	23.304	2.511	0.4	5.49	0.99	0.29	290.85	0.15
	60.2	5.002	23.304	2.511	0.4	5.49	0.99	0.29	325.85	0.15
	60.2	5.002	23.304	2.511	0.4	5.49	0.99	0.29	300.85	0.2
	60.2	5.002	23.304	2.511	0.4	5.49	0.99	0.29	343.85	0.2
	60.2	5.002	23.304	2.511	0.4	5.49	0.99	0.29	310.85	0.25

	60.2	5.002	23.304	2.511	0.4	5.49	0.99	0.29	361.85	0.25
	60.2	5.002	23.304	2.511	0.4	5.49	0.99	0.29	322.85	0.3
	60.2	5.002	23.304	2.511	0.4	5.49	0.99	0.29	379.85	0.3
	60.2	5.002	23.304	2.511	0.4	5.49	0.99	0.29	333.85	0.35
	60.2	5.002	23.304	2.511	0.4	5.49	0.99	0.29	398.85	0.35
	60.2	5.002	23.304	2.511	0.4	5.49	0.99	0.29	346.85	0.4
	60.2	5.002	23.304	2.511	0.4	5.49	0.99	0.29	411.85	0.4
	60.2	5.002	23.304	2.511	0.4	5.49	0.99	0.29	359.85	0.45
	60.2	5.002	23.304	2.511	0.4	5.49	0.99	0.29	429.85	0.45
	60.2	5.002	23.304	2.511	0.4	5.49	0.99	0.29	370.85	0.5
	60.2	5.002	23.304	2.511	0.4	5.49	0.99	0.29	443.85	0.5
	60.2	5.002	23.304	2.511	0.4	5.49	0.99	0.29	382.85	0.55
	60.2	5.002	23.304	2.511	0.4	5.49	0.99	0.29	459.85	0.55
	60.2	5.002	23.304	2.511	0.4	5.49	0.99	0.29	388.85	0.6
	60.2	5.002	23.304	2.511	0.4	5.49	0.99	0.29	473.85	0.6
	60.2	5.002	23.304	2.511	0.4	5.49	0.99	0.29	400.85	0.65
	60.2	5.002	23.304	2.511	0.4	5.49	0.99	0.29	488.85	0.65
	60.2	5.002	23.304	2.511	0.4	5.49	0.99	0.29	408.85	0.7
	60.2	5.002	23.304	2.511	0.4	5.49	0.99	0.29	498.85	0.7
108	45.95	5.17	32.16	1.12	0.61	12.87	1.34	0.53	205.85	0.1
	45.95	5.17	32.16	1.12	0.61	12.87	1.34	0.53	250.85	0.2
	45.95	5.17	32.16	1.12	0.61	12.87	1.34	0.53	296.85	0.3
	45.95	5.17	32.16	1.12	0.61	12.87	1.34	0.53	342.85	0.4
	45.95	5.17	32.16	1.12	0.61	12.87	1.34	0.53	389.85	0.5
	45.95	5.17	32.16	1.12	0.61	12.87	1.34	0.53	429.85	0.6
	45.95	5.17	32.16	1.12	0.61	12.87	1.34	0.53	482.85	0.7
	45.95	5.17	32.16	1.12	0.61	12.87	1.34	0.53	540.85	0.8
	45.95	5.17	32.16	1.12	0.61	12.87	1.34	0.53	592.85	0.9
109	43.09	6.39	43.53	1.4	0.57	2.85	1.77	0.76	172.85	0.05
	43.09	6.39	43.53	1.4	0.57	2.85	1.77	0.76	188.85	0.05
	43.09	6.39	43.53	1.4	0.57	2.85	1.77	0.76	184.85	0.1

	43.09	6.39	43.53	1.4	0.57	2.85	1.77	0.76	200.85	0.1
	43.09	6.39	43.53	1.4	0.57	2.85	1.77	0.76	202.85	0.15
	43.09	6.39	43.53	1.4	0.57	2.85	1.77	0.76	211.85	0.15
	43.09	6.39	43.53	1.4	0.57	2.85	1.77	0.76	232.85	0.2
	43.09	6.39	43.53	1.4	0.57	2.85	1.77	0.76	241.85	0.2
	43.09	6.39	43.53	1.4	0.57	2.85	1.77	0.76	253.85	0.25
	43.09	6.39	43.53	1.4	0.57	2.85	1.77	0.76	267.85	0.25
	43.09	6.39	43.53	1.4	0.57	2.85	1.77	0.76	264.85	0.3
	43.09	6.39	43.53	1.4	0.57	2.85	1.77	0.76	279.85	0.3
	43.09	6.39	43.53	1.4	0.57	2.85	1.77	0.76	269.85	0.35
	43.09	6.39	43.53	1.4	0.57	2.85	1.77	0.76	293.85	0.35
	43.09	6.39	43.53	1.4	0.57	2.85	1.77	0.76	286.85	0.4
	43.09	6.39	43.53	1.4	0.57	2.85	1.77	0.76	299.85	0.4
	43.09	6.39	43.53	1.4	0.57	2.85	1.77	0.76	297.85	0.45
	43.09	6.39	43.53	1.4	0.57	2.85	1.77	0.76	311.85	0.45
	43.09	6.39	43.53	1.4	0.57	2.85	1.77	0.76	314.85	0.5
	43.09	6.39	43.53	1.4	0.57	2.85	1.77	0.76	285.85	0.5
	43.09	6.39	43.53	1.4	0.57	2.85	1.77	0.76	324.85	0.55
	43.09	6.39	43.53	1.4	0.57	2.85	1.77	0.76	333.85	0.55
	43.09	6.39	43.53	1.4	0.57	2.85	1.77	0.76	333.85	0.6
	43.09	6.39	43.53	1.4	0.57	2.85	1.77	0.76	349.85	0.6
	43.09	6.39	43.53	1.4	0.57	2.85	1.77	0.76	346.85	0.65
	43.09	6.39	43.53	1.4	0.57	2.85	1.77	0.76	357.85	0.65
	43.09	6.39	43.53	1.4	0.57	2.85	1.77	0.76	366.85	0.7
	43.09	6.39	43.53	1.4	0.57	2.85	1.77	0.76	387.85	0.7
	43.09	6.39	43.53	1.4	0.57	2.85	1.77	0.76	387.85	0.75
	43.09	6.39	43.53	1.4	0.57	2.85	1.77	0.76	414.85	0.75
	43.09	6.39	43.53	1.4	0.57	2.85	1.77	0.76	410.85	0.8
	43.09	6.39	43.53	1.4	0.57	2.85	1.77	0.76	431.85	0.8
110	45.24	5.78	36.26	2.28	0.37	4.15	1.52	0.6	233.85	0.1
	45.24	5.78	36.26	2.28	0.37	4.15	1.52	0.6	256.85	0.2

	45.24	5.78	36.26	2.28	0.37	4.15	1.52	0.6	285.85	0.3
	45.24	5.78	36.26	2.28	0.37	4.15	1.52	0.6	317.85	0.4
	45.24	5.78	36.26	2.28	0.37	4.15	1.52	0.6	337.85	0.5
	45.24	5.78	36.26	2.28	0.37	4.15	1.52	0.6	367.85	0.6
	45.24	5.78	36.26	2.28	0.37	4.15	1.52	0.6	385.85	0.7
	45.24	5.78	36.26	2.28	0.37	4.15	1.52	0.6	417.85	0.8
	45.24	5.78	36.26	2.28	0.37	4.15	1.52	0.6	451.85	0.9
111	42.6	5.29	43.4	0.51	0.14	6	1.48	0.76	281.85	0.1
	42.6	5.29	43.4	0.51	0.14	6	1.48	0.76	307.85	0.2
	42.6	5.29	43.4	0.51	0.14	6	1.48	0.76	325.85	0.3
	42.6	5.29	43.4	0.51	0.14	6	1.48	0.76	344.85	0.4
	42.6	5.29	43.4	0.51	0.14	6	1.48	0.76	360.85	0.5
	42.6	5.29	43.4	0.51	0.14	6	1.48	0.76	371.85	0.6
	42.6	5.29	43.4	0.51	0.14	6	1.48	0.76	382.85	0.7
	42.6	5.29	43.4	0.51	0.14	6	1.48	0.76	393.85	0.8
	42.6	5.29	43.4	0.51	0.14	6	1.48	0.76	408.85	0.9
112	45.27	5.97	47.67	1.09	0	2.81	1.57	0.79	243.85	0.1
	45.27	5.97	47.67	1.09	0	2.81	1.57	0.79	262.85	0.2
	45.27	5.97	47.67	1.09	0	2.81	1.57	0.79	277.85	0.3
	45.27	5.97	47.67	1.09	0	2.81	1.57	0.79	296.85	0.4
	45.27	5.97	47.67	1.09	0	2.81	1.57	0.79	315.85	0.5
	45.27	5.97	47.67	1.09	0	2.81	1.57	0.79	328.85	0.6
	45.27	5.97	47.67	1.09	0	2.81	1.57	0.79	337.85	0.7
	45.27	5.97	47.67	1.09	0	2.81	1.57	0.79	353.85	0.8
	45.27	5.97	47.67	1.09	0	2.81	1.57	0.79	432.85	0.9

Table S3. *100 reverse design schemes with a carbon capture efficiency of* 8.15 ± 0.65 *mmol/L. (compared with the raw dataset).*

Number	Environmental condition		Textural properties			Ultimate analysis (%)			CO_2 uptake (mmol/g)
	T (℃)	P(bar)	$S_{BET}(m^2/g)$	$V_{total}(cm^3/g)$	$V_{mic}(cm^3/g)$	C	H	N	
1	9.93	38.61	1352.60	0.91	0.95	83.19	<0.01	16.81	7.63
2	0.00	31.84	2494.32	3.00	0.83	65.73	17.89	16.38	7.55
3	0.00	30.32	3000.00	3.00	0.42	56.94	2.40	<0.01	7.73
4	0.00	30.24	281.23	0.59	0.64	99.99	<0.01	<0.01	7.57
5	0.00	36.26	543.71	1.25	0.98	97.36	2.63	<0.01	7.64
6	0.00	21.62	2517.17	1.01	0.18	80.34	<0.01	19.66	7.77
7	0.00	16.28	3000.00	1.00	0.89	24.77	<0.01	<0.01	7.89
8	0.00	20.78	3000.00	2.47	0.91	52.23	6.14	41.63	7.81
9	0.00	44.55	3000.00	1.25	0.34	94.60	0.57	4.83	7.84
10	0.00	44.31	1281.41	0.92	0.00	67.33	<0.01	32.67	7.78
11	0.00	24.83	2679.03	1.71	0.45	67.55	<0.01	32.45	7.58
12	0.00	32.86	2102.89	1.06	1.00	96.36	<0.01	3.64	7.80
13	0.00	18.94	1020.72	2.62	0.95	80.55	<0.01	19.45	7.70
14	0.00	26.17	2921.14	0.74	0.90	67.01	<0.01	32.99	7.87
15	0.00	22.04	1484.05	1.03	0.31	72.65	27.35	<0.01	7.75
16	0.00	30.93	1501.63	3.00	0.00	81.70	18.30	<0.01	7.74
17	0.00	36.12	2595.80	0.54	1.00	60.32	<0.01	39.68	7.87
18	0.00	20.53	1944.55	1.52	1.00	65.62	<0.01	34.38	7.87
19	0.00	43.35	3000.00	0.57	<0.01	72.36	27.64	<0.01	7.73
20	0.00	34.07	562.25	1.10	1.00	99.99	<0.01	<0.01	7.84
21	0.00	39.29	3000.00	1.52	0.39	70.68	16.54	12.78	7.51
22	0.00	32.94	3000.00	1.85	<0.01	67.30	32.70	<0.01	7.68

23	0.00	20.09	716.97	0.44	0.43	69.04	<0.01	30.96	7.57
24	0.00	37.60	1310.20	0.99	1.00	47.60	18.49	33.91	7.60
25	0.00	27.84	1303.96	3.00	0.99	79.89	19.86	0.25	7.87
26	0.00	20.72	768.56	0.76	<0.01	99.99	<0.01	<0.01	7.85
27	0.00	23.89	1566.64	2.15	0.44	67.26	<0.01	32.74	7.78
28	0.00	30.75	1871.20	2.49	0.73	99.99	<0.01	<0.01	7.87
29	0.00	31.90	3000.00	3.00	0.38	67.87	<0.01	32.13	7.82
30	0.00	16.58	2240.57	1.25	0.75	73.13	<0.01	26.87	7.81
31	0.00	39.25	1826.68	1.78	0.96	76.48	23.52	<0.01	7.76
32	0.00	17.70	1454.55	1.56	0.75	89.64	<0.01	10.36	7.81
33	0.00	49.68	3000.00	1.63	<0.01	99.99	<0.01	<0.01	7.77
34	0.00	23.87	627.94	2.76	0.46	99.99	0.00	<0.01	7.83
35	0.00	35.96	793.24	1.42	0.69	65.33	34.67	<0.01	7.71
36	0.00	26.97	606.46	1.56	1.00	56.27	<0.01	43.73	7.78
37	0.00	17.48	533.06	3.00	1.00	99.99	<0.01	<0.01	7.74
38	0.00	32.42	2562.84	3.00	0.85	53.62	<0.01	<0.01	7.87
39	0.00	27.65	2122.15	0.94	1.00	58.01	17.59	24.40	7.50
40	0.00	26.41	1482.71	1.59	0.50	68.45	<0.01	31.55	7.85
41	0.00	39.09	767.46	1.07	0.80	73.51	<0.01	26.49	7.84
42	0.00	15.92	1980.73	2.19	0.04	85.67	<0.01	14.33	7.67
43	0.00	40.22	2298.78	1.80	0.80	86.19	<0.01	13.81	7.87
44	0.00	36.57	1994.44	1.27	1.00	75.35	<0.01	24.65	7.87
45	0.00	25.23	826.88	2.46	0.51	57.80	<0.01	42.20	7.79
46	0.00	15.74	1501.03	0.93	0.11	53.02	<0.01	46.98	7.53
47	0.00	44.15	1865.70	1.55	1.00	63.22	12.51	24.27	7.61
48	0.00	50.00	3000.00	1.23	0.28	64.39	<0.01	35.61	7.82
49	0.00	42.17	1764.69	3.00	0.38	56.76	<0.01	43.24	7.87
50	0.00	26.45	2302.59	3.00	0.63	69.20	<0.01	30.80	7.87
51	0.00	17.01	1246.37	1.18	0.58	99.99	<0.01	<0.01	7.62
52	0.00	38.44	290.21	1.02	0.97	99.99	0.00	<0.01	7.56
53	0.00	25.89	852.41	2.70	0.43	39.69	9.96	46.00	7.58

54	0.00	21.33	1460.13	3.00	0.42	81.17	<0.01	<0.01	8.40
55	0.00	21.68	1345.25	0.44	0.15	64.42	<0.01	35.58	7.89
56	0.00	19.29	1374.86	2.98	0.47	74.12	25.88	<0.01	7.57
57	0.00	32.91	1575.76	3.00	0.47	67.48	32.52	<0.01	8.06
58	0.00	39.71	2446.60	0.43	0.23	76.52	23.48	<0.01	8.04
59	0.00	32.95	1271.51	2.16	0.76	99.99	<0.01	<0.01	7.99
60	0.00	25.78	790.68	0.69	0.30	99.99	<0.01	<0.01	7.90
61	0.00	25.63	3000.00	0.68	0.60	69.63	<0.01	30.37	8.16
62	0.00	22.12	1197.90	1.26	1.00	79.34	20.66	<0.01	7.63
63	0.00	17.41	1643.70	0.41	1.00	77.98	22.02	<0.01	7.72
64	0.00	35.08	1694.97	0.36	<0.01	96.17	<0.01	3.83	7.74
65	0.00	42.74	2991.11	1.58	0.54	55.11	16.06	28.83	7.65
66	0.00	21.66	1154.84	2.54	0.99	58.27	<0.01	41.73	8.77
67	0.00	24.99	1355.01	2.65	0.27	72.47	<0.01	27.53	8.28
68	0.00	19.26	1549.33	1.14	0.19	65.55	<0.01	34.45	7.82
69	0.00	36.63	1975.16	0.76	1.00	74.38	<0.01	25.62	8.47
70	0.00	46.31	2829.40	1.55	<0.01	69.56	<0.01	30.44	7.95
71	0.00	26.45	2230.95	0.84	1.00	95.12	<0.01	4.88	8.19
72	0.00	37.17	3000.00	0.51	0.44	71.47	28.53	0.00	8.15
73	0.00	25.63	1244.24	0.70	0.38	76.47	<0.01	23.53	7.76
74	0.00	33.15	2140.11	1.50	1.00	69.31	30.69	<0.01	7.96
75	0.00	41.50	2249.78	0.54	1.00	99.99	<0.01	<0.01	8.40
76	0.00	45.88	1866.73	1.72	0.13	62.63	31.43	5.94	7.85
77	0.00	20.11	1194.83	1.77	0.02	48.42	12.51	39.06	7.63
78	0.00	24.56	2543.50	0.86	0.13	68.90	<0.01	31.10	8.00
79	0.00	21.27	625.23	1.92	1.00	77.48	<0.01	<0.01	8.16
80	0.00	26.42	780.64	2.68	0.40	77.00	0.00	23.00	8.00
81	0.00	40.92	2173.84	0.96	1.00	59.91	28.60	11.50	7.75
82	0.00	27.89	0.00	3.00	0.09	57.33	0.77	41.91	7.52
83	0.00	27.97	551.33	2.32	0.08	58.04	<0.01	41.96	8.80
84	0.00	43.44	3000.00	1.03	1.00	89.53	10.47	<0.01	7.68

85	0.00	41.39	1280.95	1.40	1.00	68.82	<0.01	31.18	8.33
86	0.00	27.98	3000.00	2.53	1.00	69.53	<0.01	30.47	8.26
87	0.00	22.03	667.48	2.01	0.58	0.19	7.47	21.89	7.58
88	0.00	28.93	3000.00	3.00	0.42	53.66	2.31	44.02	7.53
89	0.00	22.96	2173.23	2.47	0.83	70.11	29.89	<0.01	7.72
90	0.00	11.80	2352.23	0.87	0.18	20.09	<0.01	<0.01	7.75
91	0.00	28.28	1509.82	3.00	0.99	86.91	<0.01	13.09	8.17
92	0.00	29.41	1870.87	3.00	0.30	84.67	<0.01	15.33	8.15
93	0.00	28.48	489.11	3.00	0.56	67.99	<0.01	32.01	8.09
94	0.00	18.40	1409.83	0.62	0.77	63.73	<0.01	36.27	7.85
95	0.00	36.63	2688.90	1.60	0.87	91.56	8.44	<0.01	7.58
96	0.00	35.23	856.70	2.60	<0.01	67.54	32.46	<0.01	7.81
97	0.00	30.67	2537.11	2.26	0.72	84.98	<0.01	15.02	7.94
98	0.00	29.41	2129.03	3.00	1.00	73.41	<0.01	26.59	8.39
99	0.00	31.47	3000.00	2.28	0.42	71.81	28.19	<0.01	7.74
100	0.00	16.19	2051.50	2.70	0.97	73.50	<0.01	26.50	8.09

Table S4. *100 reverse design schemes with a carbon capture efficiency of* 2.20 ± 0.50 *mmol/L. (compared with the latest literature)* .

Number	**Environmental condition**		**Textural properties**			**Ultimate analysis (%)**			CO_2 **uptake (mmol/g)**
	T (℃)	**P(bar)**	$S_{BET}(m^2/g)$	$V_{total}(cm^3/g)$	$V_{mic}(cm^3/g)$	**C**	**H**	**N**	
1	0.00	0.00	1000.00	0.90	0.86	60.05	<0.01	39.95	2.12
2	291.59	4.89	1000.00	0.94	0.98	71.80	28.20	<0.01	2.63
3	452.79	3.38	1000.00	1.00	<0.01	48.10	22.17	29.73	2.48
4	348.90	2.27	1000.00	0.87	0.62	70.03	29.97	<0.01	2.61
5	0.00	0.00	775.95	1.00	0.74	76.36	<0.01	23.64	2.20

6	0.00	0.00	93.76	0.82	0.61	61.65	14.24	24.11	1.86
7	0.00	0.00	584.30	1.00	0.82	24.93	15.36	34.45	2.14
8	0.00	0.00	1000.00	1.00	1.00	55.32	19.05	<0.01	1.83
9	126.50	1.04	802.90	0.68	<0.01	56.30	9.89	33.81	2.53
10	177.97	5.33	1000.00	1.00	0.31	99.99	<0.01	<0.01	2.59
11	0.00	0.00	828.50	1.00	0.83	52.52	11.84	35.64	1.77
12	0.00	0.00	1000.00	0.89	0.98	99.99	<0.01	<0.01	2.53
13	10.44	0.00	532.86	0.67	0.05	92.40	7.60	<0.01	2.32
14	0.00	0.00	1000.00	0.88	1.00	65.78	34.22	<0.01	2.02
15	0.00	0.00	497.77	1.00	0.69	99.99	<0.01	<0.01	2.14
16	0.00	0.00	1000.00	1.00	1.00	60.30	16.09	23.61	1.98
17	965.64	4.90	595.38	<0.01	0.69	99.99	<0.01	<0.01	2.24
18	0.00	0.00	799.60	<0.01	1.00	99.99	<0.01	<0.01	1.92
19	1067.17	1.00	1000.00	<0.01	0.40	56.99	<0.01	43.01	2.06
20	0.00	0.00	1000.00	1.00	0.33	89.71	<0.01	10.29	2.08
21	62.50	3.96	1000.00	0.03	0.29	88.52	11.48	<0.01	2.38
22	0.00	0.44	1000.00	1.00	1.00	74.54	25.46	<0.01	2.19
23	0.00	0.00	1000.00	0.91	0.96	70.04	29.96	<0.01	1.92
24	0.00	0.00	1000.00	1.00	0.87	99.99	<0.01	<0.01	2.24
25	0.00	0.00	248.41	0.85	0.10	99.99	<0.01	<0.01	2.37
26	0.00	0.00	1000.00	1.00	0.50	75.76	<0.01	24.24	2.18
27	0.00	0.00	610.20	1.00	0.28	64.56	<0.01	35.44	2.20
28	0.00	0.00	212.95	0.20	<0.01	24.45	<0.01	34.38	1.81
29	0.00	0.00	1000.00	<0.01	1.00	65.02	<0.01	34.98	1.95
30	0.00	0.00	1000.00	1.00	0.50	20.05	4.04	47.22	2.11
31	0.00	0.00	913.45	1.00	1.00	58.08	<0.01	41.92	2.12
32	344.52	4.49	1000.00	1.00	0.05	88.30	11.70	<0.01	2.47
33	0.00	0.00	1000.00	1.00	0.85	78.97	<0.01	21.03	2.17
34	0.00	0.00	1000.00	1.00	<0.01	54.25	27.11	18.64	1.85
35	0.00	0.00	59.87	0.81	1.00	73.99	26.01	<0.01	2.29
36	0.00	0.00	430.87	1.00	0.15	74.52	25.48	<0.01	1.99

37	0.00	0.00	1000.00	0.70	0.04	85.73	14.27	<0.01	2.53
38	471.50	4.38	178.35	0.55	0.36	18.84	<0.01	4.54	2.46
39	390.27	4.65	1000.00	1.00	0.35	86.44	13.56	<0.01	2.51
40	0.00	0.00	770.29	<0.01	0.71	99.99	<0.01	<0.01	2.10
41	0.00	0.00	1000.00	1.00	0.44	62.35	<0.01	37.65	1.92
42	0.00	0.00	1000.00	1.00	0.75	56.71	19.02	24.27	1.88
43	0.00	0.00	55.95	0.93	0.15	99.99	<0.01	<0.01	2.05
44	0.00	0.00	1000.00	0.99	1.00	61.87	6.50	31.63	1.92
45	0.00	0.00	1000.00	0.24	0.46	99.99	<0.01	<0.01	2.08
46	0.00	0.00	1000.00	1.00	0.48	67.17	30.98	1.85	1.79
47	0.00	0.00	1000.00	0.51	0.56	64.83	31.17	4.01	1.97
48	0.00	0.00	1000.00	1.00	1.00	60.00	<0.01	40.00	2.12
49	0.00	0.00	1000.00	<0.01	0.55	99.99	<0.01	<0.01	1.91
50	0.00	0.00	1000.00	0.35	0.74	71.96	24.43	3.60	1.97
51	0.00	0.00	741.65	1.14	1.00	76.95	23.05	<0.01	2.55
52	0.00	0.00	1222.60	<0.01	0.11	56.53	14.95	28.52	2.18
53	825.52	1.67	2102.34	1.82	<0.01	99.99	<0.01	<0.01	2.65
54	0.00	0.00	1376.26	1.66	1.00	88.20	<0.01	11.80	2.61
55	0.00	0.16	2031.50	1.78	1.00	99.99	<0.01	<0.01	2.64
56	0.00	0.00	499.02	0.41	0.45	64.53	29.41	6.06	2.56
57	0.00	0.00	<0.01	2.23	1.00	70.09	<0.01	29.91	2.23
58	333.79	5.08	878.23	1.98	0.26	81.62	18.38	<0.01	2.55
59	0.00	0.00	1429.61	1.97	0.68	67.81	<0.01	32.19	2.65
60	231.30	19.79	<0.01	<0.01	<0.01	60.01	<0.01	39.99	2.28
61	0.00	0.00	703.02	1.47	0.96	58.26	22.12	19.61	2.33
62	0.00	0.00	1888.83	1.75	0.17	96.28	<0.01	3.72	2.23
63	0.00	0.00	<0.01	2.72	0.21	65.87	10.51	23.63	2.39
64	0.00	0.00	787.90	1.00	0.47	70.96	29.04	<0.01	2.21
65	0.00	0.00	2275.08	<0.01	0.23	99.99	<0.01	<0.01	2.45
66	0.00	0.00	1406.01	1.34	0.40	99.99	<0.01	<0.01	2.29
67	0.00	0.00	1010.35	0.14	1.00	72.25	27.75	<0.01	1.92

68	0.00	0.00	2135.63	<0.01	0.31	60.79	26.43	12.78	2.45
69	0.00	0.00	2691.01	0.10	0.40	63.75	20.73	15.52	2.46
70	0.00	0.00	453.29	0.64	<0.01	61.74	2.95	35.30	1.98
71	95.84	5.11	2008.86	2.13	1.00	69.83	30.17	<0.01	2.63
72	1034.41	2.95	<0.01	2.06	0.67	18.90	29.45	14.10	2.35
73	38.60	0.00	3000.00	1.63	0.71	53.45	11.08	35.48	1.70
74	0.00	0.00	3000.00	0.37	0.63	78.27	17.47	4.26	2.49
75	0.00	0.00	1336.16	1.85	1.00	80.91	<0.01	19.09	2.48
76	0.00	0.00	920.25	1.28	0.58	69.56	<0.01	30.44	2.29
77	0.00	0.00	3000.00	1.25	0.45	71.26	<0.01	<0.01	2.67
78	460.39	5.26	2518.95	0.01	0.38	99.99	<0.01	<0.01	2.24
79	0.00	0.00	3000.00	<0.01	1.00	75.95	24.05	<0.01	2.63
80	14.47	0.00	1271.94	0.24	0.23	64.22	<0.01	35.78	1.87
81	0.00	0.00	3000.00	<0.01	0.64	99.99	<0.01	<0.01	2.08
82	0.00	0.00	<0.01	<0.01	0.36	63.74	8.47	27.79	1.89
83	0.00	0.00	1110.55	1.98	1.00	59.50	4.22	36.28	2.44
84	0.00	0.00	1082.80	<0.01	0.59	66.71	<0.01	33.29	1.90
85	0.00	0.00	521.84	1.96	<0.01	94.92	<0.01	5.08	2.20
86	1102.69	19.89	<0.01	0.06	<0.01	67.82	<0.01	32.18	2.39
87	747.82	4.83	<0.01	3.00	<0.01	54.96	22.71	22.32	2.26
88	0.00	0.00	1719.30	0.38	0.37	48.11	11.24	<0.01	2.65
89	0.00	0.16	1153.57	<0.01	0.73	31.20	21.18	35.51	1.83
90	124.67	3.79	393.00	1.34	1.00	99.99	<0.01	<0.01	2.43
91	0.00	0.00	2967.78	<0.01	0.50	90.30	<0.01	9.70	2.57
92	0.00	0.00	<0.01	3.00	1.00	67.62	32.38	<0.01	2.65
93	158.61	0.00	2760.33	2.52	0.00	74.29	<0.01	25.71	1.71
94	0.00	0.00	1351.88	1.60	0.72	61.99	10.99	27.02	2.65
95	0.00	0.00	338.07	1.97	1.00	62.16	29.67	8.17	2.38
96	0.00	0.00	672.51	1.00	0.58	50.43	17.96	31.61	2.03
97	0.00	0.00	477.11	1.60	0.41	59.26	<0.01	40.74	2.47
98	0.00	0.00	<0.01	2.01	0.06	72.71	<0.01	27.29	2.25

99	16.83	0.00	1659.64	3.00	0.52	67.72	<0.01	32.28	2.38
100	5.63	0.00	2507.51	2.32	0.33	80.83	19.17	<0.01	2.65

Table S5. *100 reverse design schemes with a porous carbon conversion rate of* 0.95 ± 0.10. *(compared with the raw dataset).*

Number	Ultimate analysis(%)						H/C	O/C	T(℃)	Z
	C	H	O	N	S	Ash				
1	38.53	23.23	<0.01	<0.01	30.20	35.37	0.37	0.84	874.12	0.96
2	23.81	22.05	25.53	4.20	24.40	<0.01	0.73	2.33	488.77	0.97
3	29.09	15.82	22.02	<0.01	33.07	59.37	2.59	<0.01	695.15	0.95
4	2.95	19.63	33.40	38.09	5.94	53.09	3.61	2.99	1429.95	0.95
5	39.18	9.74	30.73	<0.01	20.35	14.78	2.84	1.07	446.15	0.91
6	22.27	<0.01	43.04	26.73	7.97	8.77	0.98	<0.01	1147.97	0.97
7	16.87	2.25	26.31	<0.01	45.59	22.81	1.46	2.43	849.37	0.96
8	42.29	43.77	13.94	<0.01	<0.01	51.23	2.57	0.42	563.20	0.96
9	14.38	17.85	52.62	15.15	<0.01	53.18	<0.01	2.04	243.66	0.97
10	24.80	19.92	33.54	21.75	<0.01	17.18	2.85	1.33	732.31	0.96
11	21.36	<0.01	27.03	<0.01	40.89	38.70	1.32	1.18	1294.54	0.96
12	16.64	16.05	15.88	14.69	36.74	45.29	<0.01	1.81	1190.14	0.96
13	45.36	6.15	9.33	39.17	<0.01	35.57	1.58	<0.01	1162.93	0.97
14	25.58	18.58	52.40	0.53	2.91	47.61	2.97	2.28	789.60	0.96
15	11.53	28.61	43.55	16.32	<0.01	32.16	2.41	3.11	398.59	0.88
16	45.79	<0.01	11.67	<0.01	<0.01	<0.01	0.43	3.02	1291.71	0.96
17	36.92	13.31	30.35	<0.01	19.42	36.18	3.44	3.08	637.20	0.88
18	7.00	10.49	71.37	<0.01	11.13	40.24	<0.01	1.16	456.11	0.97
19	43.29	20.52	14.15	22.03	<0.01	<0.01	0.36	<0.01	574.96	0.97
20	16.41	14.13	30.33	39.13	<0.01	<0.01	1.20	2.29	841.93	0.97

21	38.53	23.23	<0.01	<0.01	30.20	35.37	0.37	0.84	874.12	0.96
22	23.81	22.05	25.53	4.20	24.40	<0.01	0.73	2.33	488.77	0.97
23	29.09	15.82	22.02	<0.01	33.07	59.37	2.59	<0.01	695.15	0.95
24	2.95	19.63	33.40	38.09	5.94	53.09	3.61	2.99	1429.95	0.95
25	39.18	9.74	30.73	<0.01	20.35	14.78	2.84	1.07	446.15	0.91
26	22.27	<0.01	43.04	26.73	7.97	8.77	0.98	<0.01	1147.97	0.97
27	16.87	2.25	26.31	<0.01	45.59	22.81	1.46	2.43	849.37	0.96
28	42.29	43.77	13.94	<0.01	<0.01	51.23	2.57	0.42	563.20	0.96
29	14.38	17.85	52.62	15.15	<0.01	53.18	<0.01	2.04	243.66	0.97
30	24.80	19.92	33.54	21.75	<0.01	17.18	2.85	1.33	732.31	0.96
31	21.36	<0.01	27.03	<0.01	40.89	38.70	1.32	1.18	1294.54	0.96
32	16.64	16.05	15.88	14.69	36.74	45.29	<0.01	1.81	1190.14	0.96
33	45.36	6.15	9.33	39.17	<0.01	35.57	1.58	<0.01	1162.93	0.97
34	25.58	18.58	52.40	0.53	2.91	47.61	2.97	2.28	789.60	0.96
35	11.53	28.61	43.55	16.32	<0.01	32.16	2.41	3.11	398.59	0.88
36	45.79	<0.01	11.67	<0.01	<0.01	<0.01	0.43	3.02	1291.71	0.96
37	36.92	13.31	30.35	<0.01	19.42	36.18	3.44	3.08	637.20	0.88
38	7.00	10.49	71.37	<0.01	11.13	40.24	<0.01	1.16	456.11	0.97
39	43.29	20.52	14.15	22.03	<0.01	<0.01	0.36	<0.01	574.96	0.97
40	16.41	14.13	30.33	39.13	<0.01	<0.01	1.20	2.29	841.93	0.97
41	22.29	9.92	44.61	23.19	<0.01	3.81	0.32	0.25	521.55	0.96
42	41.01	21.83	<0.01	22.05	15.11	<0.01	3.98	<0.01	1198.77	0.95
43	21.15	1.68	29.08	<0.01	48.09	25.57	<0.01	1.34	815.25	0.96
44	<0.01	42.32	13.83	<0.01	43.85	31.90	1.69	<0.01	1093.51	0.96
45	25.17	19.52	20.60	22.86	11.84	<0.01	0.25	1.79	600.96	0.96
46	59.92	15.08	25.00	<0.01	<0.01	38.95	<0.01	1.22	894.98	0.96
47	31.28	8.08	33.38	<0.01	27.26	64.73	0.97	0.86	1193.00	0.96
48	2.83	46.56	<0.01	<0.01	<0.01	3.22	1.45	1.73	1595.12	0.96
49	22.52	24.80	33.64	5.22	13.81	25.56	2.49	1.58	495.70	0.95
50	11.14	<0.01	23.27	39.33	26.26	12.87	<0.01	<0.01	875.59	0.97
51	12.16	<0.01	87.84	<0.01	<0.01	43.84	0.93	<0.01	626.55	0.96

52	43.86	0.10	<0.01	18.88	37.16	49.93	1.04	<0.01	1108.08	0.95
53	46.13	6.33	22.75	14.04	10.75	29.16	1.52	<0.01	1000.25	0.95
54	34.71	19.77	18.94	17.61	8.97	<0.01	3.97	0.70	876.88	0.95
55	21.53	29.24	39.21	<0.01	10.02	<0.01	0.17	0.29	597.90	0.95
56	28.02	12.19	19.77	15.59	24.43	3.77	<0.01	<0.01	889.58	0.95
57	31.26	27.87	<0.01	<0.01	4.05	<0.01	<0.01	<0.01	859.33	0.95
58	40.10	18.10	14.91	<0.01	26.89	14.95	3.59	<0.01	880.78	0.96
59	15.61	16.30	68.10	<0.01	<0.01	<0.01	2.01	0.02	1195.24	0.95
60	7.02	<0.01	16.26	51.54	<0.01	<0.01	1.47	1.00	837.84	0.93
61	22.49	10.56	51.99	<0.01	14.97	<0.01	<0.01	<0.01	581.28	0.95
62	24.35	<0.01	70.01	5.65	<0.01	10.25	1.96	1.53	579.60	0.85
63	49.79	18.29	31.92	<0.01	<0.01	<0.01	<0.01	<0.01	610.17	0.95
64	40.05	27.96	31.99	<0.01	<0.01	26.45	0.43	<0.01	918.97	0.95
65	47.26	<0.01	27.48	25.26	<0.01	39.83	0.61	2.56	1202.80	0.96
66	3.75	0.47	18.36	<0.01	22.51	48.21	0.02	<0.01	872.40	0.95
67	22.37	19.87	43.19	3.91	10.65	<0.01	0.98	2.34	1032.58	0.95
68	29.27	26.67	44.06	<0.01	<0.01	<0.01	<0.01	<0.01	482.69	0.95
69	22.88	16.79	18.12	3.29	38.92	16.57	2.21	2.29	859.09	0.95
70	19.55	16.62	34.83	28.99	<0.01	<0.01	2.48	<0.01	1075.48	0.96
71	<0.01	<0.01	51.40	42.99	<0.01	14.80	2.08	<0.01	1230.38	0.95
72	64.48	12.09	<0.01	<0.01	23.43	<0.01	2.95	<0.01	420.10	0.92
73	11.85	<0.01	37.47	26.26	24.42	30.12	1.59	1.09	401.36	0.97
74	37.94	9.45	20.24	<0.01	32.37	16.85	1.89	<0.01	1491.04	0.96
75	14.47	<0.01	57.11	<0.01	28.42	<0.01	0.19	2.68	1226.43	0.95
76	33.69	16.40	19.24	17.66	13.01	4.62	3.03	2.54	693.25	0.95
77	24.29	16.57	32.74	18.63	7.78	<0.01	2.43	<0.01	471.63	0.95
78	40.36	19.29	16.10	<0.01	24.25	<0.01	2.90	2.76	895.25	0.96
79	21.37	10.40	36.95	<0.01	31.29	<0.01	0.73	<0.01	1608.13	0.96
80	9.08	16.58	48.18	26.16	<0.01	48.76	2.65	1.03	1159.92	0.96
81	14.91	10.61	29.91	<0.01	44.56	50.06	2.75	2.03	845.11	0.96
82	51.05	22.80	13.82	<0.01	12.33	<0.01	4.04	0.66	592.28	0.97

83	40.84	5.00	35.74	16.92	1.50	<0.01	1.36	<0.01	1154.70	0.92
84	30.24	23.97	14.26	31.54	<0.01	61.83	4.52	<0.01	729.56	0.97
85	45.05	<0.01	33.66	<0.01	21.29	19.51	1.15	<0.01	1529.07	0.92
86	43.44	10.71	4.74	41.11	<0.01	22.62	<0.01	2.63	710.43	0.96
87	32.90	31.98	5.57	29.55	<0.01	<0.01	2.82	0.53	557.33	0.96
88	48.67	2.13	42.43	6.76	<0.01	34.12	0.75	2.24	1255.97	0.96
89	32.65	16.13	5.26	29.19	<0.01	33.97	0.83	<0.01	1022.59	0.96
90	33.32	24.21	1.26	16.31	24.90	19.92	<0.01	2.79	874.41	0.96
91	34.82	23.69	18.97	<0.01	22.51	<0.01	0.67	<0.01	593.58	0.95
92	17.32	<0.01	<0.01	10.02	28.29	30.30	<0.01	0.25	811.81	0.96
93	40.41	19.26	11.03	17.34	11.96	<0.01	1.60	<0.01	1161.44	0.96
94	31.15	40.59	<0.01	16.05	<0.01	33.82	3.08	<0.01	1206.20	0.97
95	27.64	22.22	5.54	<0.01	44.61	58.57	0.56	1.21	982.53	0.96
96	24.25	0.34	<0.01	43.88	<0.01	64.68	0.27	2.92	1078.23	0.95
97	62.07	24.34	<0.01	13.58	<0.01	10.16	0.47	<0.01	793.97	0.96
98	14.78	13.24	47.31	12.80	11.88	32.46	<0.01	0.32	661.38	0.95
99	15.28	<0.01	44.80	15.41	24.51	61.04	0.97	<0.01	335.05	0.91
100	9.49	48.52	<0.01	<0.01	16.01	9.28	3.81	2.95	687.15	0.96

Table S6. *100 reverse design schemes with a porous carbon conversion rate of* 0.22 ± 0.05. *(compared with the latest literature).*

Number	**Ultimate analysis(%)**						**H/C**	**O/C**	**T(℃)**	**Z**
	C	**H**	**O**	**N**	**S**	**Ash**				
1	61.11	21.08	13.48	<0.01	4.33	<0.01	2.00	0.88	0.00	0.26
2	52.62	27.56	19.82	<0.01	<0.01	<0.01	2.00	0.58	0.00	0.23
3	45.68	27.14	<0.01	14.67	12.51	<0.01	2.00	1.00	0.00	0.27
4	68.92	6.66	20.15	<0.01	4.27	40.70	2.00	1.00	455.92	0.27

5	<0.01	31.30	21.73	36.90	<0.01	11.92	1.46	0.00	30.60	0.26
6	36.48	2.29	16.31	<0.01	9.16	<0.01	0.62	0.17	312.48	0.24
7	7.39	19.55	6.13	<0.01	<0.01	<0.01	1.20	0.11	0.00	0.25
8	60.43	<0.01	39.57	<0.01	<0.01	<0.01	1.44	0.86	422.74	0.27
9	40.59	28.94	19.45	<0.01	11.02	<0.01	2.00	0.07	0.00	0.25
10	32.88	30.86	36.26	<0.01	<0.01	37.66	1.33	0.77	0.00	0.23
11	62.70	<0.01	2.51	<0.01	34.79	22.34	2.00	1.00	891.32	0.29
12	24.79	45.67	23.76	<0.01	<0.01	5.83	2.00	0.82	139.28	0.24
13	55.11	5.44	26.37	13.09	<0.01	<0.01	2.00	0.29	580.12	0.27
14	91.57	<0.01	<0.01	<0.01	8.43	16.45	2.00	0.57	1008.20	0.25
15	47.47	2.86	38.32	11.35	<0.01	<0.01	2.00	1.00	711.71	0.23
16	83.13	<0.01	<0.01	<0.01	16.87	23.62	2.00	0.74	1480.51	0.29
17	44.31	21.10	11.56	<0.01	23.03	0.04	0.33	0.39	0.00	0.29
18	31.03	28.94	29.67	<0.01	10.36	41.91	1.89	1.00	0.00	0.24
19	19.16	29.92	19.66	25.58	5.69	<0.01	2.00	0.46	0.00	0.25
20	27.50	30.34	42.16	<0.01	<0.01	3.08	0.89	0.51	0.00	0.25
21	26.64	8.43	35.37	4.73	24.82	55.90	1.78	0.77	0.00	0.23
22	36.00	12.53	29.85	18.88	2.75	<0.01	2.00	0.41	208.95	0.28
23	37.04	34.65	<0.01	<0.01	28.31	0.60	2.00	0.00	0.00	0.25
24	30.75	10.19	35.99	9.01	14.07	11.84	2.00	0.92	0.00	0.29
25	8.65	<0.01	<0.01	<0.01	51.88	<0.01	0.92	0.31	285.56	0.21
26	50.96	13.62	<0.01	25.25	10.17	51.02	1.66	0.57	187.56	0.29
27	3.60	<0.01	67.48	18.37	<0.01	39.77	1.56	0.60	111.80	0.28
28	<0.01	20.43	31.83	<0.01	15.88	<0.01	1.76	0.71	0.00	0.27
29	33.77	9.67	29.98	10.87	15.71	<0.01	2.00	0.75	0.00	0.28
30	54.35	1.69	34.05	<0.01	9.91	46.16	2.00	0.21	850.83	0.29
31	10.10	7.36	64.25	18.29	<0.01	41.16	2.00	0.96	0.00	0.24
32	16.92	<0.01	68.68	14.40	<0.01	52.15	1.90	1.00	155.07	0.29
33	56.57	12.83	30.59	<0.01	<0.01	3.72	1.02	1.00	0.00	0.20
34	29.53	<0.01	4.64	<0.01	<0.01	39.18	1.04	1.00	0.00	0.27
35	34.45	<0.01	<0.01	<0.01	<0.01	21.88	0.91	1.00	0.00	0.28

36	39.95	<0.01	51.37	<0.01	8.68	<0.01	0.29	0.52	337.59	0.26
37	48.18	19.37	32.45	<0.01	<0.01	5.57	2.00	0.57	211.28	0.25
38	61.95	<0.01	18.56	19.50	<0.01	<0.01	0.54	0.80	306.31	0.27
39	30.87	25.28	29.12	14.73	<0.01	<0.01	2.00	0.68	0.00	0.22
40	32.76	7.00	4.91	15.49	39.83	12.25	2.00	0.94	0.00	0.25
41	45.57	28.29	26.14	<0.01	<0.01	<0.01	2.00	0.06	0.00	0.27
42	32.83	20.97	24.52	21.67	<0.01	<0.01	2.00	0.35	0.00	0.22
43	21.51	17.83	<0.01	33.34	27.33	<0.01	1.72	0.32	0.00	0.25
44	48.75	34.94	16.30	<0.01	<0.01	23.31	1.45	0.49	208.65	0.20
45	32.84	20.52	46.65	<0.01	<0.01	<0.01	2.00	0.82	0.00	0.25
46	8.72	<0.01	13.21	16.68	61.40	53.14	1.18	0.17	0.00	0.21
47	60.88	<0.01	24.86	<0.01	10.80	45.15	2.00	0.87	1281.24	0.30
48	1.52	<0.01	37.01	10.18	<0.01	35.91	1.82	0.84	0.00	0.28
49	27.38	15.76	28.95	22.88	5.03	30.21	1.81	0.48	25.04	0.23
50	<0.01	28.23	47.83	23.94	<0.01	<0.01	1.58	0.33	0.00	0.22
51	<0.01	16.38	76.80	4.86	1.96	3.47	1.81	0.65	0.00	0.25
52	34.04	12.52	28.62	19.39	5.43	<0.01	1.58	0.34	142.94	0.28
53	9.96	12.97	21.75	27.66	27.66	41.30	1.90	0.18	0.00	0.21
54	42.31	21.97	10.91	24.77	<0.01	52.30	2.00	0.58	0.00	0.20
55	10.79	20.69	42.83	<0.01	25.69	<0.01	1.53	0.00	131.37	0.23
56	51.14	19.69	29.16	<0.01	<0.01	<0.01	1.35	0.32	0.00	0.26
57	29.92	27.91	30.66	<0.01	11.51	<0.01	2.00	0.45	0.00	0.29
58	58.33	15.07	26.60	<0.01	<0.01	<0.01	2.00	1.00	0.00	0.21
59	22.79	22.92	31.22	<0.01	23.07	55.05	1.66	1.00	0.00	0.27
60	5.24	24.96	32.61	37.19	<0.01	<0.01	2.00	0.70	52.99	0.23
61	57.53	<0.01	29.78	<0.01	12.69	49.37	2.00	0.15	916.26	0.28
62	40.24	2.59	57.16	<0.01	<0.01	13.37	0.96	1.00	0.00	0.27
63	15.87	3.56	58.17	<0.01	<0.01	11.06	0.70	0.96	0.00	0.26
64	51.05	17.50	7.46	23.99	<0.01	41.77	2.00	0.79	97.28	0.21
65	64.71	<0.01	<0.01	35.29	<0.01	21.66	1.65	0.58	631.89	0.26
66	36.75	<0.01	<0.01	<0.01	41.70	23.36	0.65	1.00	0.00	0.25

67	44.33	24.54	22.51	<0.01	8.61	6.34	0.46	0.31	12.48	0.21
68	17.32	4.10	43.04	<0.01	35.55	14.06	1.29	1.00	0.00	0.26
69	41.78	13.47	0.09	27.51	17.15	42.74	1.54	0.39	0.00	0.21
70	45.22	23.10	29.06	<0.01	2.62	<0.01	1.41	0.60	123.15	0.24
71	22.00	<0.01	<0.01	47.76	<0.01	40.07	2.00	1.00	0.00	0.26
72	28.39	19.61	9.28	<0.01	42.72	21.07	0.69	0.61	0.00	0.27
73	49.77	<0.01	27.38	22.39	0.46	62.50	1.35	0.89	173.48	0.30
74	9.68	47.87	3.69	<0.01	<0.01	27.45	2.00	1.00	209.38	0.28
75	45.14	40.69	<0.01	<0.01	14.17	21.67	0.75	0.81	0.00	0.28
76	58.84	28.63	12.53	<0.01	<0.01	33.26	0.46	1.00	0.00	0.27
77	44.30	<0.01	53.38	<0.01	2.32	<0.01	1.73	0.23	472.03	0.27
78	3.18	17.96	56.87	<0.01	22.00	<0.01	1.33	0.35	0.00	0.27
79	27.18	13.68	30.84	13.90	14.40	30.26	1.54	0.41	96.74	0.28
80	51.40	32.31	<0.01	16.29	<0.01	<0.01	1.49	0.65	0.00	0.28
81	12.19	14.71	47.60	25.50	<0.01	47.57	2.00	1.00	0.00	0.30
82	<0.01	23.46	1.94	<0.01	4.14	14.96	2.00	1.00	0.00	0.23
83	48.07	6.64	14.68	26.61	4.00	36.04	0.38	0.39	0.00	0.25
84	70.86	29.14	<0.01	<0.01	<0.01	<0.01	2.00	0.64	0.00	0.25
85	28.70	<0.01	71.30	<0.01	<0.01	<0.01	1.43	0.34	392.55	0.30
86	30.59	18.48	10.30	40.62	<0.01	21.57	2.00	0.52	0.00	0.21
87	55.18	<0.01	6.87	37.94	<0.01	19.60	2.00	1.00	986.93	0.21
88	33.23	25.06	30.80	10.91	<0.01	42.02	1.39	0.02	0.00	0.25
89	31.93	21.73	<0.01	<0.01	<0.01	<0.01	2.00	0.71	0.00	0.27
90	39.78	21.97	20.35	17.90	<0.01	<0.01	1.78	0.65	0.00	0.25
91	22.63	24.73	15.61	<0.01	37.02	<0.01	1.47	0.29	0.00	0.27
92	20.63	29.07	33.72	16.58	<0.01	9.56	1.99	0.73	0.00	0.24
93	51.95	22.71	<0.01	23.40	1.94	1.04	1.82	0.93	0.00	0.22
94	15.29	6.35	39.37	38.98	<0.01	27.62	1.98	0.96	78.84	0.29
95	14.84	27.10	26.06	12.99	19.01	26.81	2.00	0.52	179.19	0.27
96	45.35	22.13	17.27	15.25	<0.01	28.57	2.00	0.81	0.00	0.20
97	30.31	6.21	63.48	<0.01	<0.01	34.73	0.51	0.79	0.00	0.22

98	0.09	<0.01	16.60	15.05	27.28	25.34	1.51	0.52	0.00	0.25
99	34.81	26.67	10.23	<0.01	28.30	<0.01	2.00	0.56	0.00	0.28
100	1.61	<0.01	55.20	43.19	<0.01	19.78	2.00	1.00	0.00	0.26

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