

Supporting Information

Conversion of Polystyrene into Porous Carbon Sheet and Hollow Carbon Shell over Different Magnesium Oxide Templates for Efficient Removal of Methylene Blue

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Table S1 Yields of the different fractions for the pyrolysis of PS/sheet MgO at 500, 600, 700 and 800 °C.

Temperature (°C)	500	600	700	800
Carbon (wt%)	0.3	1.0	12.2	15.0
Liquid (wt%)	99.7	98.7	87.1	84.5
Gas (wt%)	0.1	0.2	0.4	0.4

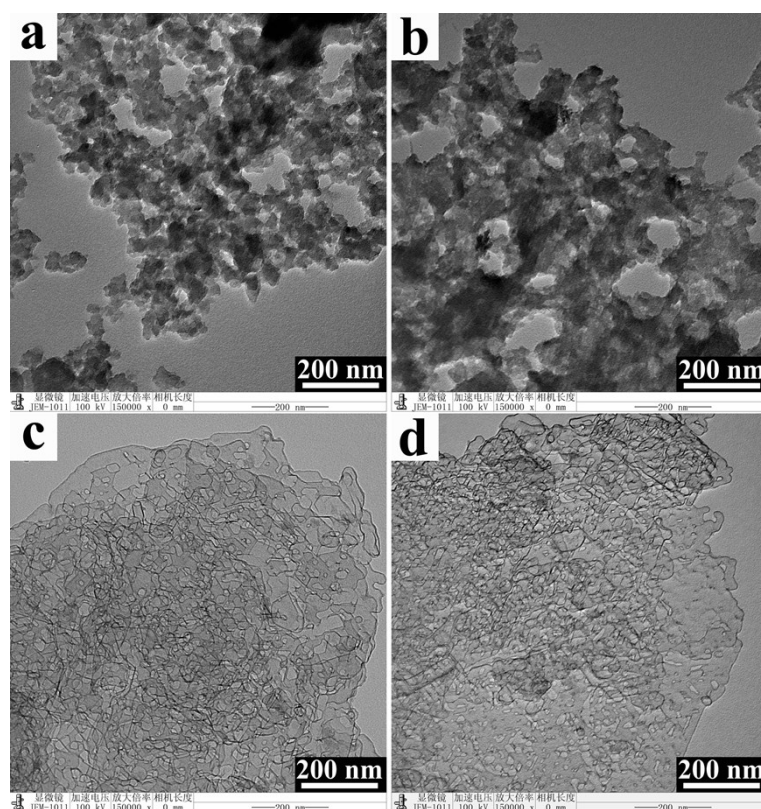


Fig. S1 TEM images of nanocarbon obtained on sheet MgO at (a) 500 °C, (b) 600 °C, (c) 700 °C, (d) 800 °C.

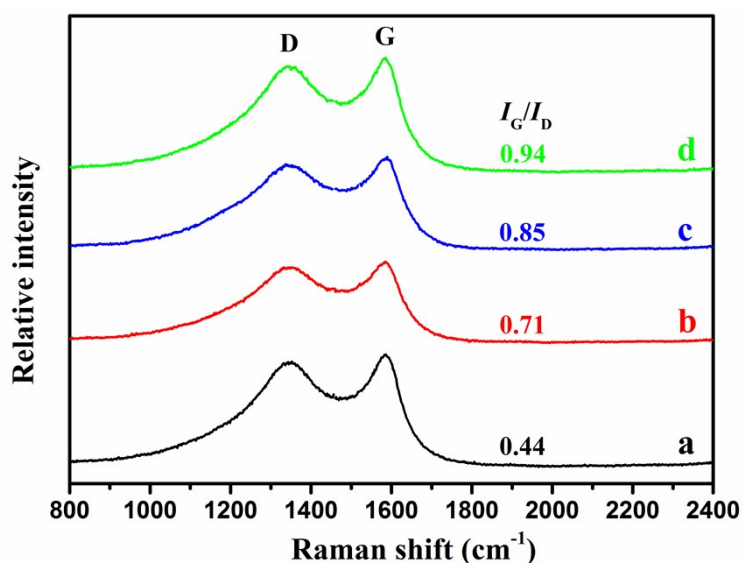


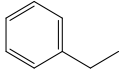
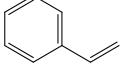
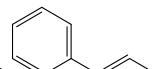
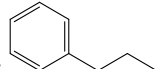
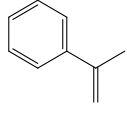
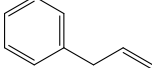
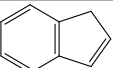
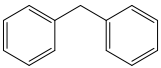
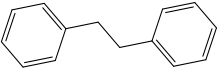
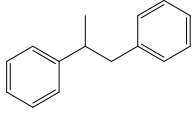
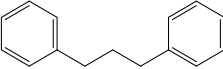
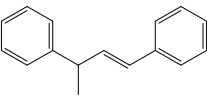
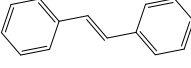
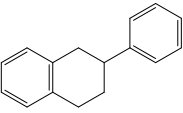
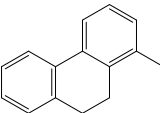
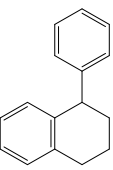
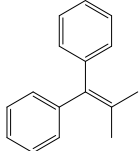
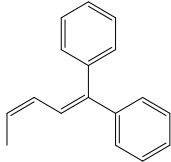
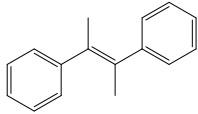
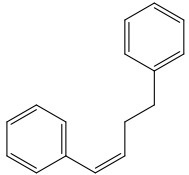
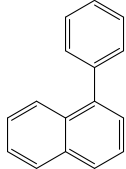
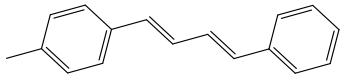
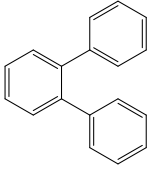
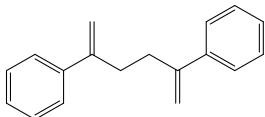


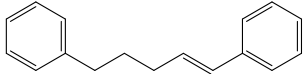
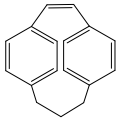
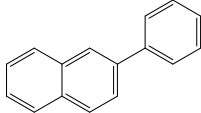
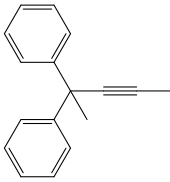
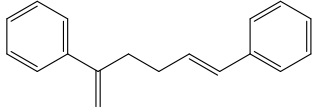
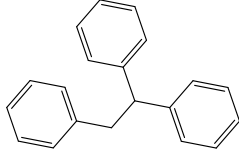
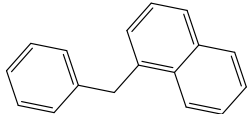
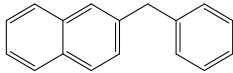
Fig. S2 Raman spectra of carbon obtained on sheet MgO at (a) 500 °C, (b) 600 °C, (c) 700 °C, (d) 800 °C.

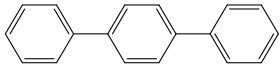
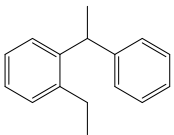
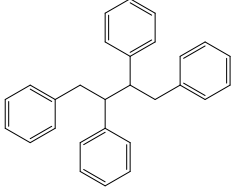
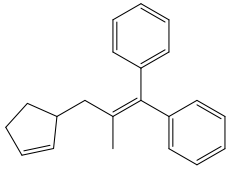
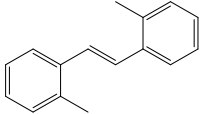
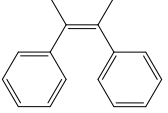
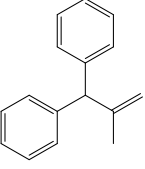
Table S2. Assignment and area percentage of the compounds in Fig. 10 that were produced by decomposition of PS and the mixture of PS/MgO at 700 °C.

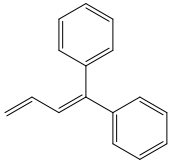
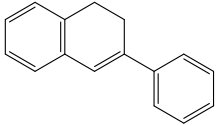
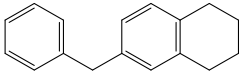
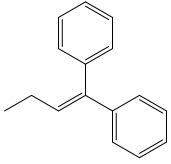
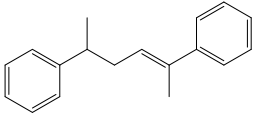
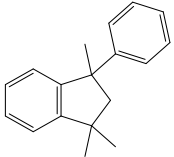
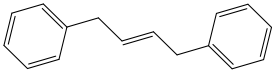
Entry	Elution time (min)	Substance	PS	PS-Sheet MgO two-stage ^a	PS-Polygonal MgO two-stage ^a	PS-Sheet MgO one-pot ^b	PS-Polygonal MgO one-pot ^b
1	1.627	Benzene 	0.1	0.2	0.1	0.3	0.6
2	2.261	Toluene 	2.7	3.8	4.6	5.2	8.0
3	3.483	Ethylbenzene 	1.4	0.9	0.8	6.7	5.5
4	4.050	Styrene 	27.2	42.6	51.1	36.2	50.2
5	4.991	(E)-prop-1-en-1-ylbenzene 	0.1	0.1	0.4	0.1	0.1
6	5.139	Propylbenzene 	0	0	0	0.6	0
7	5.598	Prop-1-en-2-ylbenzene 	3.0	2.3	2.8	2.1	6.9
8	6.485	Allylbenzene 	0.1	0.3	0.2	0.7	0.4
9	6.727	1H-indene 	0.4	0.2	0.3	0	0.5

10	12.571	Diphenylmethane		0.4	0.1	0.1	0.2	0.3
11	13.606	1,2-diphenylethane		5.2	2.3	2.6	0.8	2.2
12	14.009	Propane-1,2- diylidibenzene		2.2	1.2	1.4	0.7	1.2
13	15.166	1,3-diphenylpropane		2.1	1.2	1.1	1.0	0.5
14	15.489	(E)-but-1-ene-1,3- diylidibenzene		0.6	1.1	0	5.3	0.6
15	15.813	(E)-1,2-diphenylethene		2.5	0.6	0.3	0.4	0.6
16	15.948	2-phenyl-1,2,3,4- tetrahydronaphthalene		15.9	12.6	13.5	3.7	7.5
17	16.033	1-methyl-9,10- dihydrophenanthrene		3.2	2.2	1.8	1.6	1.7
18	16.402	1-phenyl-1,2,3,4- tetrahydronaphthalene		0.8	0.3	0.3	0.6	0.4
19	16.550	(2-methylprop-1-ene-1,1-		0	0.9	0	4.8	0.7

									
			diyl)dibenzene						
			(Z)-penta-1,3-diene-1,1-						
20	16.613			2.1	0.9	0.8	0	0.4	
			diyl)dibenzene						
			(E)-but-2-ene-2,3-						
21	16.753			0	1.1	0	5.0	1.1	
			diyl)dibenzene						
			(Z)-but-1-ene-1,4-						
22	16.971			0.9	0.8	0.6	0.5	0	
			diyl)dibenzene						
			1-phenylnaphthalene						
23	17.313			0.8	0.6	0.3	1.0	0.7	
			1-methyl-4-((1E,3E)-4-phenylbuta-						
			1,3-dien-						
24	17.518			0.4	0.5	0.3	0	0	
			1-yl)benzene						
			1,1':2',1''-terphenyl						
25	17.605			0.3	0	0	0	0.2	
			hexa-1,5-diene-2,5-						
			diyl)dibenzene						
26	17.712			2.7	1.8	1.8	0	1.0	

		(E)-pent-1-ene-1,5-						
27	18.043	diylidibenzene	0.8	0.7	0.3	0.5	0.4	
								
		(Z)-1,4(1,4)-						
28	18.390	dibenzenacycloheptaphan-2-ene	1.4	0.7	0.7	0	0.3	
								
		2-phenylnaphthalene						
29	18.482		1.8	0.7	0.2	6.9	1.7	
		Pent-3-yne-2,2-						
30	18.588	diylidibenzene	2.7	1.5	1.3	1.4	1.3	
								
		(E)-hexa-1,5-diene-1,5-						
31	18.875	diylidibenzene	0.7	0.4	0.3	0	0	
								
		Ethane-1,1,2-						
		triytribenzene						
32	19.651		0.1	0.2	0.1	0	0	
		1-benzyl-naphthalene						
33	19.739		0.1	0.5	0	6.6	0.4	
		2-benzyl-naphthalene						
34	19.993		0.9	0.2	0	0	0	

35	20.108	1,1':4',1''-terphenyl 	0.6	0	0	0.3	0.3
36	21.298	1-ethyl-2-(1-phenylethyl)benzene 	0.3	0.3	0.3	0.1	0
37	21.482	Butane-1,2,3,4-tetrayltetrabenzene 	0.2	0.2	0.1	0	0
38	22.017	(3-(cyclopent-2-en-1-yl)-2-methylprop-1-ene-1,1-diyl)dibenzene 	0	0.4	0	0.8	0.2
39	22.195	(E)-1,2-di-o-tolylolethene 	0.2	0.5	0	0.8	0
40	22.584	(Z)-but-2-ene-2,3-diyl-dibenzene 	12.3	11.5	9.5	2.3	3.3
41	22.775	(2-methylprop-2-ene-1,1-diyl)dibenzene 	0	0.3	0	0.6	0

		Buta-1,3-diene-1,1-						
42	23.109		0	0.2	0	0	0	0
		diylidibenzene						
		3-phenyl-1,2-						
		dihydronaphthalene						
43	23.258		0.2	0.3	0.2	0	0	0
		6-benzyl-1,2,3,4-						
		tetrahydronaphthalene						
44	23.381		0.3	0.2	0.3	0	0	0
		But-1-ene-1,1-						
45	23.433		0	0.7	0	1.2	0.4	0
		diylidibenzene						
		(E)-hex-2-ene-2,5-						
		diylidibenzene						
46	23.555		0.2	0.2	0.1	0	0	0
		1,1,3-trimethyl-3-phenyl-2,3-						
		dihydro-1H-indene						
47	23.624		0.2	0.2	0.1	0	0	0
		(E)-1,4-diphenylbut-						
		2-ene						
48	23.844		0.3	0.2	0.2	0	0	0
49	24.364	4'-phenyl-1,1':2',1''-	0	0	0	0.4	0	0

