Supplementary Information

Production of phenols from a cyclic sugar alcohol in high-temperature water over a charcoal-supported platinum catalyst

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Detailed operating conditions of GC

The gaseous products were collected with a glass syringe and analyzed using a gas chromatograph (Shimadzu GC-8A) equipped with a Shincarbon ST column and a thermal conductivity detector. The oven temperature was initially set at 50 °C, increased to 200 °C at a rate of 10 °C min^{-1} over 15 min, and then held at 200 °C until the total analysis time reached 50 min.

The Liquid products in the filtrate were quantitatively analyzed using a second gas chromatograph (Agilent HP-6890) equipped with a DB-WAX capillary column and a flame ionization detector. Either 1-propanol or 1-butanol was used as the internal standard. For the analysis, the filtrate was diluted and mixed with the internal standard in a vial. The oven temperature was initially set at 80 °C and held for 5 min, then increased to 230 °C at a rate of 5 °C min^{-1} over 30 min, and finally maintained at 230 °C until the total analysis time reached 60 min.

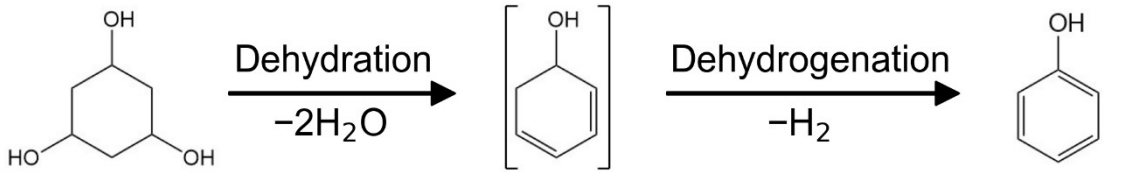
Product distribution identified by GC-MS

The *myo*-inositol conversion was repeated three times under identical conditions (Pt/C in water at 250 °C for 1 h). All byproducts identified by GC-MS (Agilent 5977A MSD) analysis are summarized in Table S1. The standard errors of the yields of aromatic compounds, gaseous products, and solid residues were calculated within the 2σ range and included in Table S1.

Table S1

Results of *myo*-inositol conversion into aromatic compounds over Pt/C in water at 250 °C for 1 h. Gas composition shown in parentheses.

Catalyst	5%Pt/C
Aromatic compounds yield (C%)	42±1.4
Phenol	34
Catechol	6.7
Resorcinol	0.90
Hydroquinnone	0.0
p-Cresol	0.02
3-Propylphenol	0.02
Benzene	0.65
p-Xylene	0.79
Indane	0.03
Naphthalene	0.11
Bibenzyl	0.06
Non-aromatic compounds yield (C%)	0.27±0.0016
Cyclohexanone	0.08
1,2,3-Cyclohexanetriol	0.17
Gas yield (C%)	35±6.0
H_2	- (1.7)
CH_4	0. (3.5)
CO_2	27 (89)
C_2H_6	(5.9)
Solid yield (wt%)	1.0±0.95



Cyclohexanetriol Phenol

Scheme S1 Plausible reaction routes from cyclohexanetriol to phenol

Table S2

Gas and solid yields from the conversion of *myo*-inositol over Pt/C catalyst at various reaction temperatures (Pt/C 0.15 g; *myo*-inositol 0.20 g; water 1.0 g; reaction time 1 h)

Temperature (°C)	Gas yield (C%)	Gas composition (%)				Solid yield (wt%)
		H_2	CH_4	CO_2	C_2H_6	
200	26	0.1	3.4	90	6.7	20
250[a]	31	1.7	3.5	89	5.9	2.6
300	35	3.5	3.3	89	4.7	2.4

[a] Data were taken from Table 1.

Table S3

Gas and solid yields from the conversion of *myo*-inositol over Pt/C catalyst with various water amounts (Pt/C 0.15 g; *myo*-inositol 0.20 g; reaction temperature 250 °C; reaction time 1 h)

Weight of water (g)	Gas yield (C%)	Gas composition (%)				Solid yield (wt%)
		H_2	CH_4	CO_2	C_2H_6	
0.5	15	1.4	3.3	92	3.4	12
1.0 [a]	31	1.7	3.5	89	5.9	2.6
2.0	18	2.1	3.1	89	6.1	0.8
3.0	13	2.5	3.4	88	6.0	0.0

[a] Data were taken from Table 1.

Table S4

Gas and solid yields from the conversion of *myo*-inositol over Pt/C catalyst with different reaction times (Pt/C 0.15 g; *myo*-inositol 0.20 g; water 1.0 g; reaction temperature 250 °C)

Reaction time (min)	Gas yield (C%)	Gas composition (%)				Solid yield (wt%)
		H_2	CH_4	CO_2	C_2H_6	
30	33	1.3	2.8	90	6.1	1.0
60[a]	31	1.7	3.5	89	5.9	2.6
120	40	0.3	3.0	91	5.6	0.2

[a] Data were taken from Table 1.

Table S5

Gas and solid yields from the conversion of phenolic compounds over Pt/C catalyst (Pt/C 0.15 g; phenolic compounds 0.20 g; water 1.0 g; reaction temperature 250 °C; reaction time 1 h)

Phenolic compound	Gas yield (C%)	Gas composition (%)				Solid yield (wt%)
		H_2	CH_4	CO_2	C_2H_6	
Catechol	12	0.7	0.0	99	0.0	3.2
Resorcinol	2.6	0.5	0.0	99	0.0	4.1
Hydroquinone	6.7	0.0	0.0	99	0.0	3.5
1,2,3-Trihydroxybenzene	21	0.4	0.0	99	0.2	8.6
1,2,4-Trihydroxybenzene	12	0.2	1.2	98	0.3	29
1,3,5-Trihydroxybenzene	12	1.1	0.7	98	0.0	28

Table S6

Gas and solid yields from the recycling test (Pt/C 0.15 g; *myo*-inositol 0.20 g; water 1.0 g; reaction temperature 250 °C; reaction time 1 h)

Number of uses	Gas yield (C%)	Gas composition (%)				Solid yield (wt%)
		H_2	CH_4	CO_2	C_2H_6	
1[a]	31	1.7	3.5	89	5.9	2.6
2	21	1.4	4.2	90	4.7	0.0
3	24	0.6	2.7	92	4.9	1.2

[a] Data were taken from Table 1.