Supporting Information

Efficient conversion of cellulose to 5-hydroxymethylfurfural catalyzed by a cobalt-phosphonate catalyst

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[c] School of Chemistry and Chemical Engineering, Hubei key laboratory of biomass fiber and ecological dyeing and finishing, Wuhan Textile University, Wuhan 430200, P. R. China

[d] Tianjin Key Lab for Rare Earth Materials and Applications, State Key Laboratory of Elemento-Organic Chemistry, School of Materials Science and Engineering, Nankai University, Tianjin, 300350, P. R. ChinaKeywords: 5-hydroxymethylfurfural, cellulose, heterogeneous catalysis, cobalt-phosphonate network.

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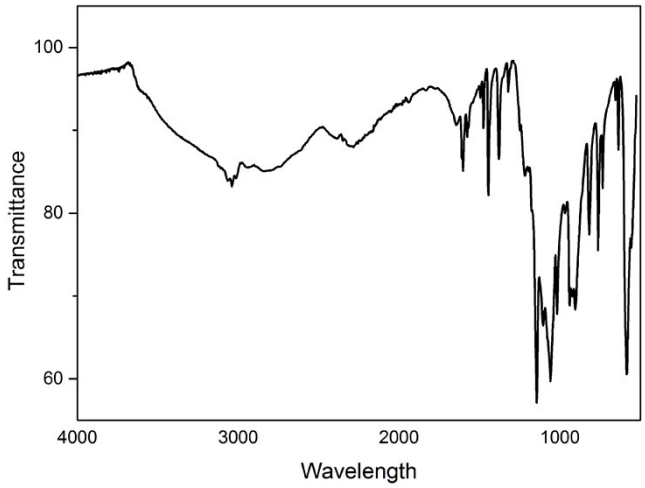


Figure S1. IR spectrum of Co318. IR (KBr, cm^{-1}): 3069 (m), 3039 (m), 3006 (m), 1645 (m), 1615 (m), 1587 (m), 1488 (m), 1450 (m), 1392 (m), 1332 (m), 1222 (m), 1145 (vs), 1112 (s), 1057 (vs), 1013 (s), 950 (s), 901 (s), 794 (m), 761 (m), 736 (m), 648 (m), 585 (vs).

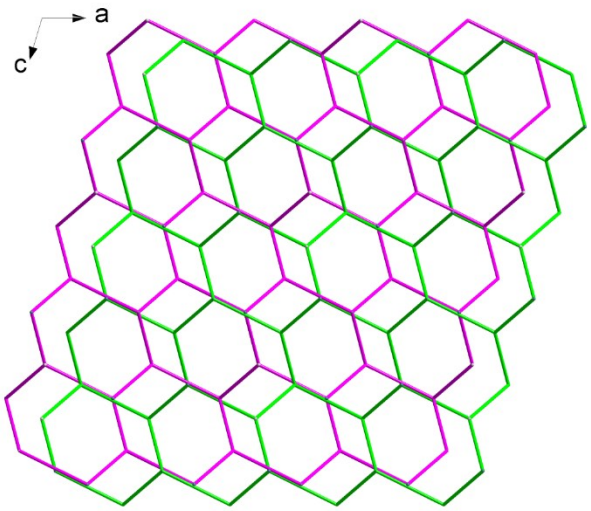


Figure S2. Topology of Co318 in double interpenetrated dia.

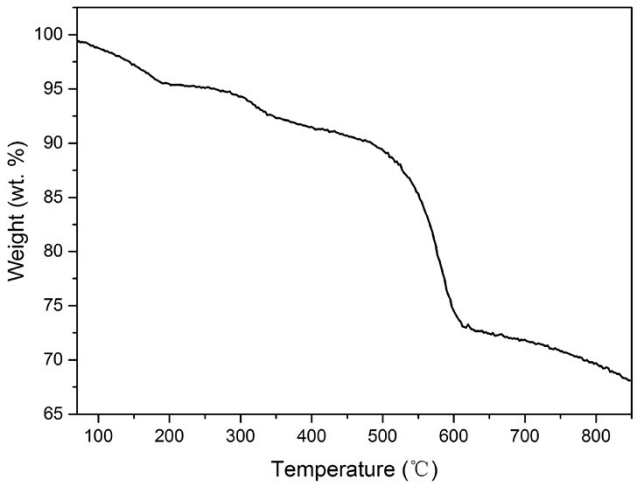


Figure S3. TGA curve of Co318.

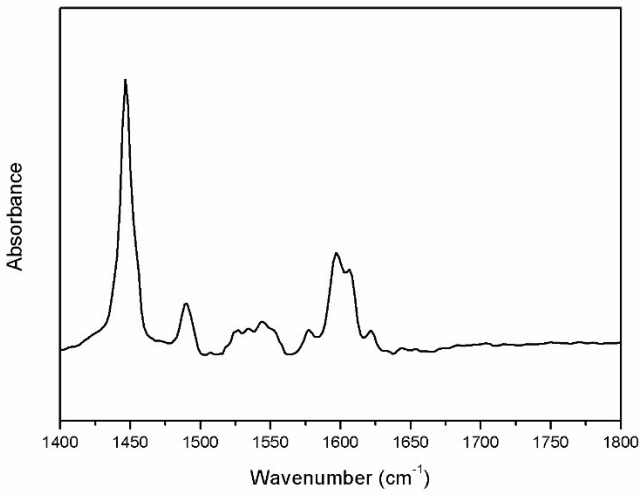


Figure S4. Py-FTIR spectrum of Co318.

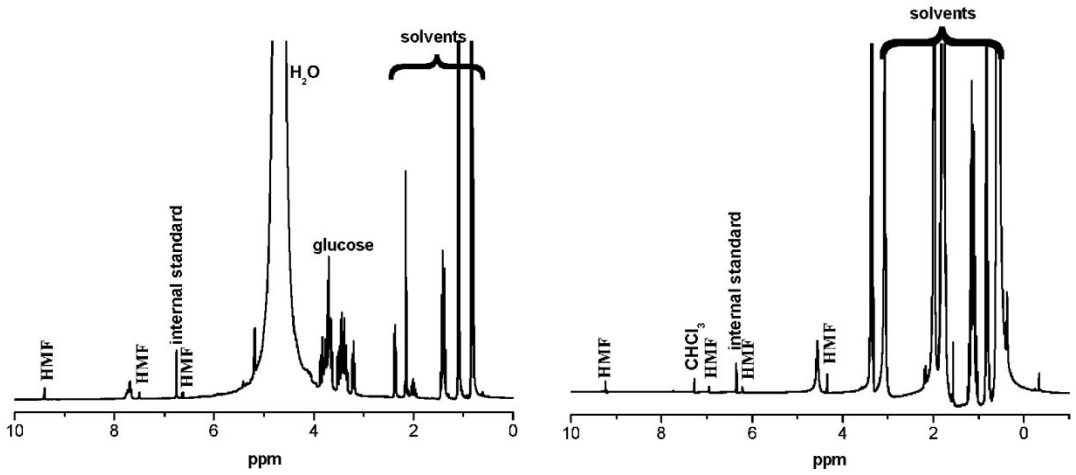


Figure S5. ^{1}H NMR spectra of reaction mixtures from glucose (left: water phase in D_2O; right: organic phase in $CDCl_3$).

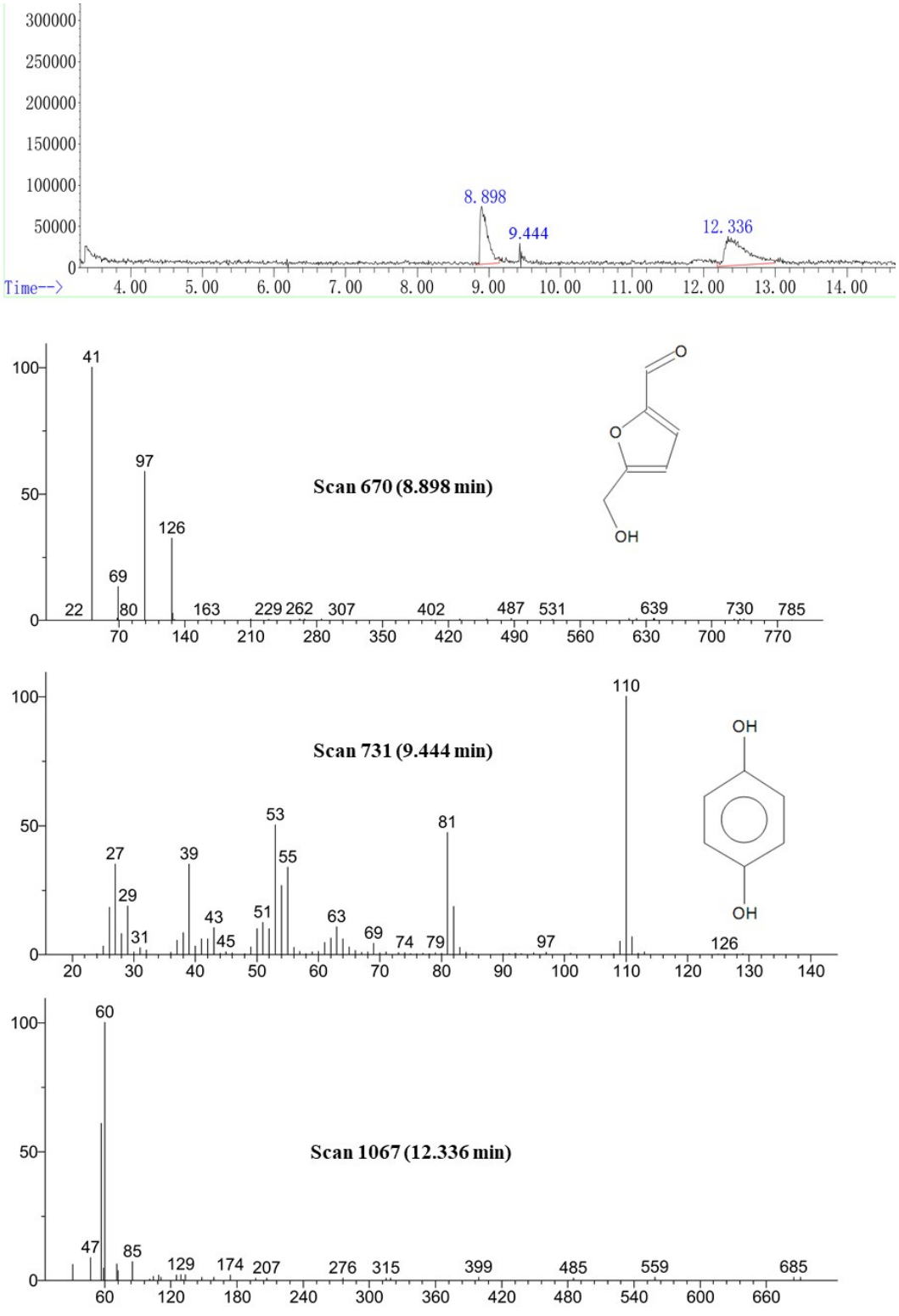


Figure S6. GC-MS spectra of reaction mixtures from glucose (water phase).

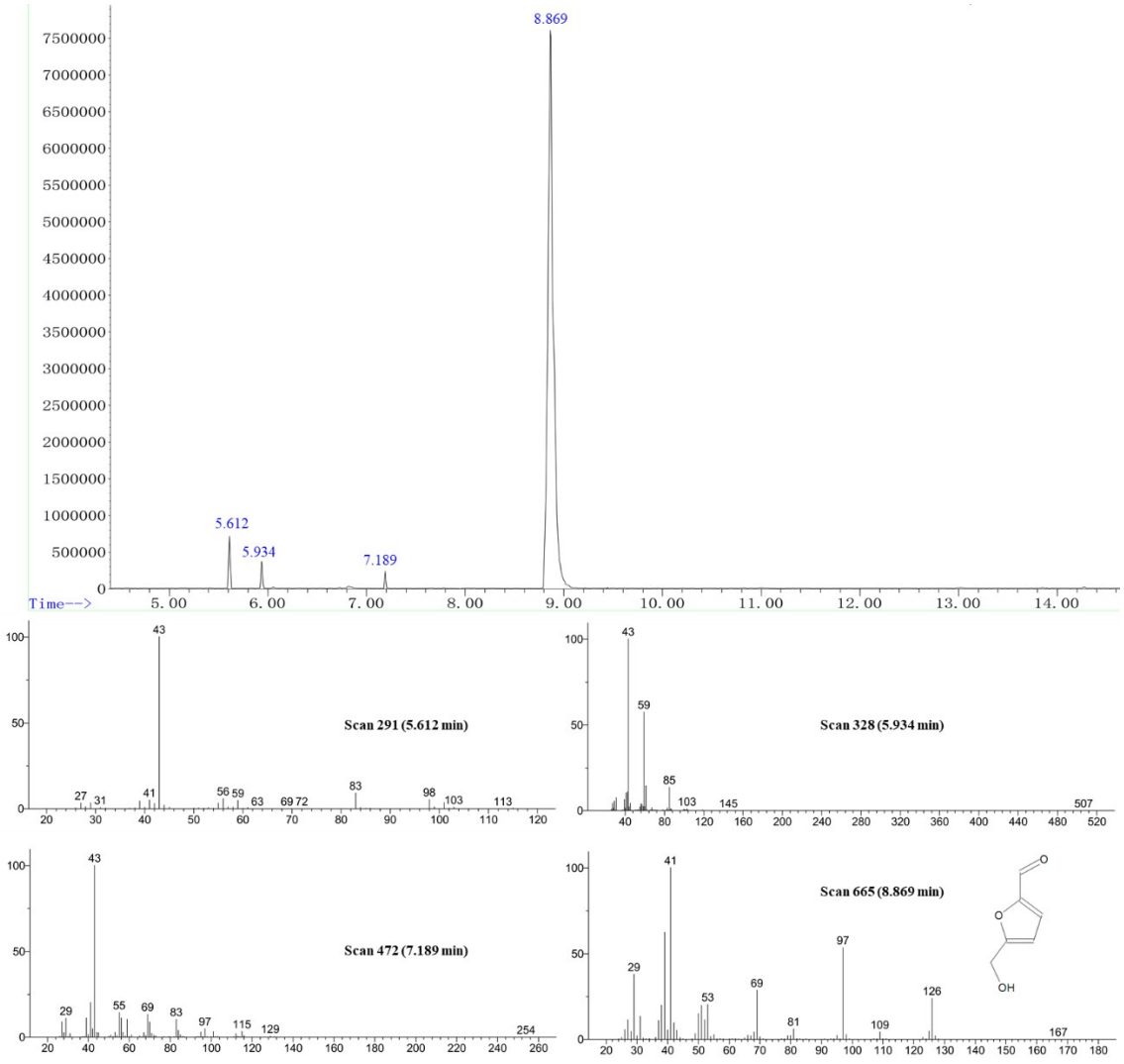


Figure S7. GC-MS spectra of reaction mixtures from glucose (organic phase).

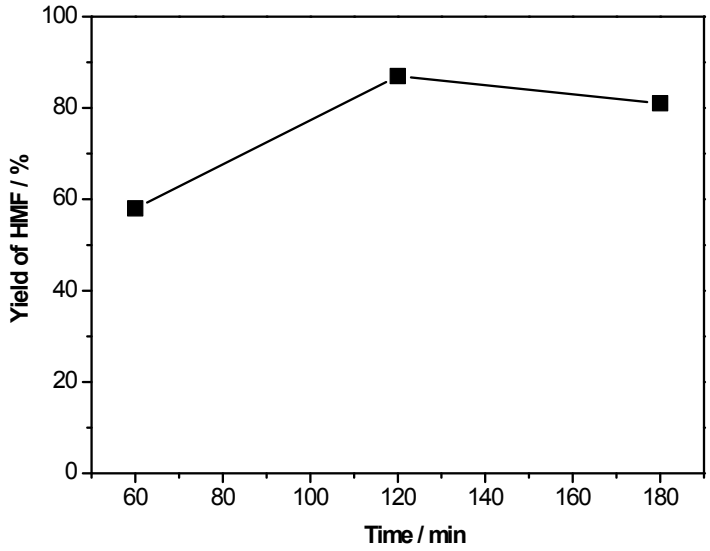


Figure S8. Effect of reaction time on the dehydration of glucose. Reaction conditions: glucose (200 mg), Co318 (20 mg), 190 °C, solvent: saturated NaCl/MIBK-2-butanol (1.8 mL/7.2 mL-3.0 mL).

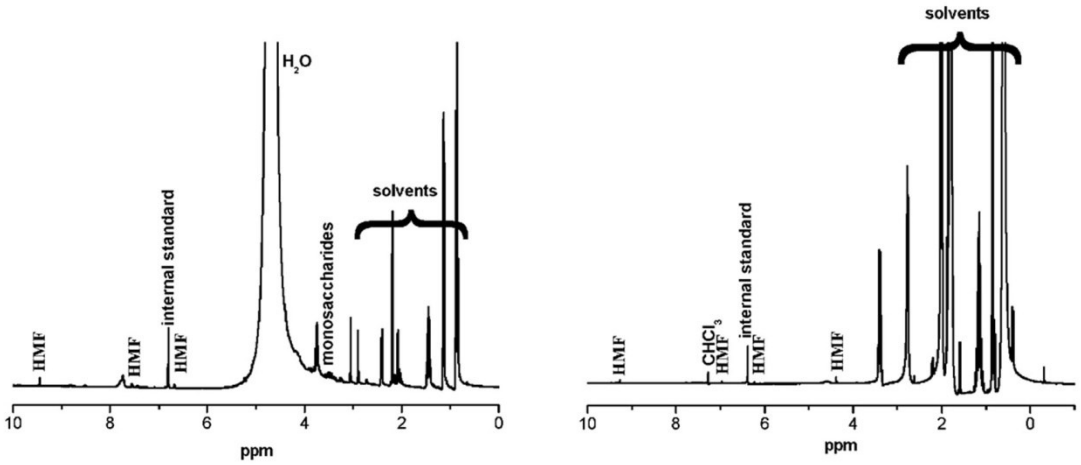
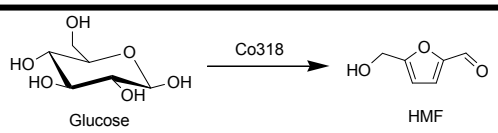


Figure S9. ^{1}H NMR spectra of reaction mixtures from the treatment of cellulose catalyzed by Co318 (left: water phase in D_2O; right: organic phase in $CDCl_3$).

Table S1. Effect of the solvent composition on the dehydration of glucose.[a]



Glucose HMF

	Water/MIBK/2-butanol/NaCl (mL/mL/mL/g)	Yield (%)
1	1.8/0/0/0	21
2	1.8/3.6/0/0	38
3	1.8/3.6/0/0.1	43
4	1.8/3.6/1.5/0.1	51
5	1.8/7.2/1.5/0.1	58
6	1.8/7.2/3.0/0.1	64
7	1.8/7.2/3.0/0.65	87

[a] Reaction condition: glucose (200 mg), Co318 (20 mg), 200 °C, 1 h.