Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information for

Hydrolysis of Regenerated Cellulose from Ionic Liquids and Deep Eutectic Solvent over Sulfonated Carbon Catalysts

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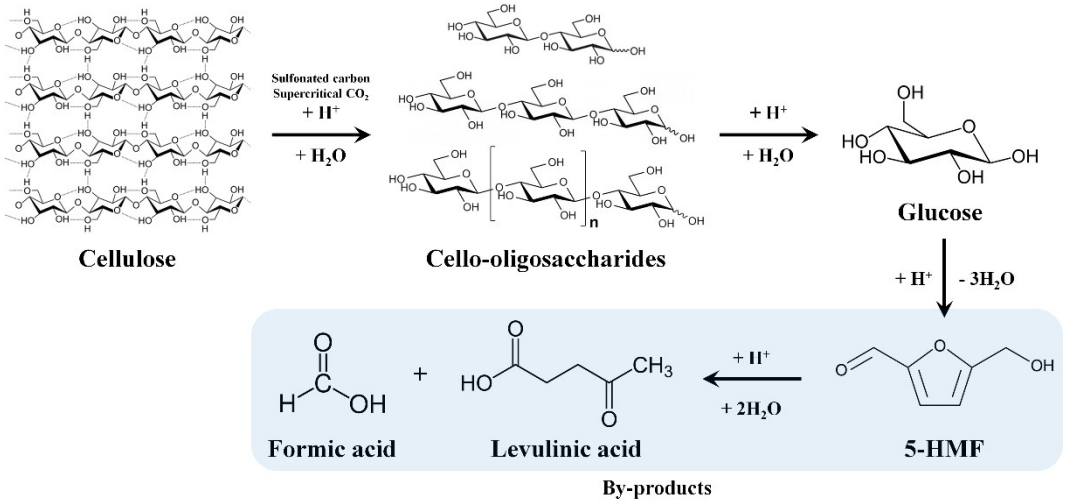

Fig. S1. The reaction network for the hydrolysis of cellulose.

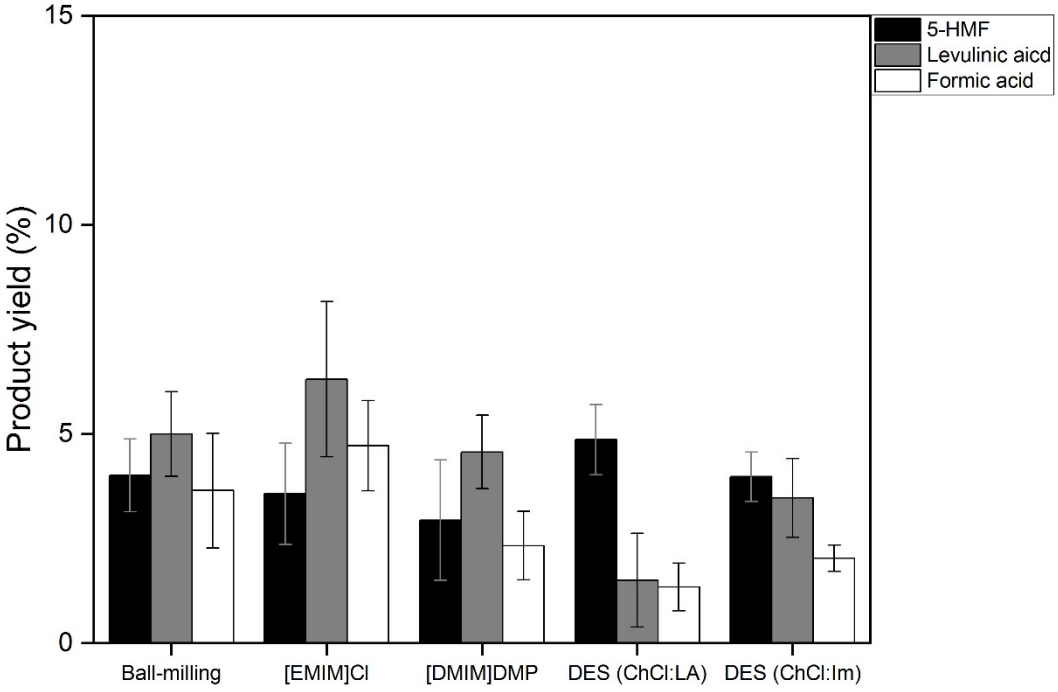

Fig. S2. The by-product distribution obtained from the cellulose hydrolysis (reaction condition: cellulose 0.05 g, catalyst 0.05 g, D.I. water 40 mL, Temp. 150 ℃, Time 12 h).

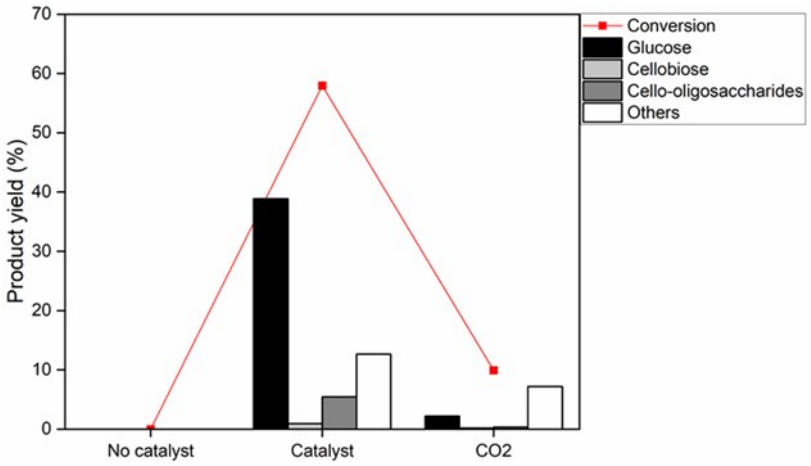

Fig. S3. Comparison of hydrolysis reactivity of the ball-milled cellulose without any catalyst and with only supercritical CO_2 (reaction conditions: cellulose 0.324 g, D.I. water 40 mL, Temp. 150 ℃, Time 12 h, supercritical CO_2 injection 100 bar).

Table S1. Comparison of the hydrolysis activity of the DR process with those of other conventional processes.

Catalyst	Pre-treatment	Solvent	Temp. (K)	Time (h)	Glucose yield (%)	Ref.
$H_3PW_{12}O_{40}$	Ball-milling	H_2O	423	2	18	[31]
H-beta zeolite	Ball-milling	H_2O	423	24	12	[32]
CMK-3-SO_3H	Ball-milling	H_2O	423	24	74.5	[15]
$H_5BW_{12}O_{40}$	Ball-milling	H_2O	333	24	77	[35]
AC-N-SO_3H	Ball-milling	H_2O	423	24	62.6	[15]
Amberlyst-15	-	[BMIM]Cl/H_2O	373	5	11	[29]
HY zeolite	-	[BMIM]Cl	403	2	50	[34]
Nafion NR50	[BMIM]Cl	H_2O	433	4	35	[28]
AC-SO_3H+CO_2	[EMIM]Cl	H_2O	423	12	80	**This work**

Table S2. Summary table of reaction results of the pretreated cellulose.

Entry	Pre-treatment	Conversion (%)	Yield (%)			
			Glucose	Cellobiose	Cello-oligosaccharides	Others
1	Ball-milling	57.94	38.88	0.96	5.44	12.66
2	[EMIM]Cl	95.16	66.64	6.32	7.6	14.6
3	[DMIM]DMP	86.6	63.28	4.32	6.16	12.84
4	DES (ChCl:LA)	63.3	40.16	7.2	8.24	7.7
5	DES (ChCl:Im)	84.7	53.87	7.54	13.81	9.48

reaction conditions: cellulose 0.05 g, catalyst 0.05 g, D.I. water 40 mL, Temp. 150 ℃, Time 12 h.

Table S3. Summary table of reaction results of the pretreated cellulose with supercritical CO_2.

Entry	Pre-treatment	Conversion (%)	Yield (%)			
			Glucose	Cellobiose	Cello-oligosaccharides	Others
1	Ball-milling	98.67	70.74	0.2	0.38	27.35
2	[EMIM]Cl	99.9	82.61	0.68	5.6	11.01
3	[DMIM]DMP	99.9	76	1.01	8.81	14.08
4	DES (ChCl:LA)	99.9	62.16	3.8	15.24	18.7
5	DES (ChCl:Im)	99.9	69.89	2.09	10.61	17.31

reaction conditions: cellulose 0.05 g, catalyst 0.05 g, D.I. water 40 mL, Temp. 150 ℃, Time 12 h, supercritical CO_2 injection 100 bar.

Table S4. Summary table of by-products distribution from the hydrolysis of regenerated cellulose in the presence of supercritical CO_2.

Entry	Pre-treatment	Yield (%)		
		5-HMF	Levulinic acid	Formic acid
1	Ball-milling	0.53	12.55	13.27
2	[EMIM]Cl	0.22	6.23	4.56
3	[DMIM]DMP	0.12	6.86	7.1
4	DES (ChCl:LA)	2.6	8.71	7.39
5	DES (ChCl:Im)	1.05	9.49	6.77

reaction conditions: cellulose 0.05 g, catalyst 0.05 g, D.I. water 40 mL, Temp. 150 °C, Time 12 h, supercritical CO_2 injection 100 bar.