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Supporting Information

Inulin Dehydration to 5-HMF in Deep Eutectic Solvents Catalyzed by Acidic Ionic Liquids Under Mild Conditions

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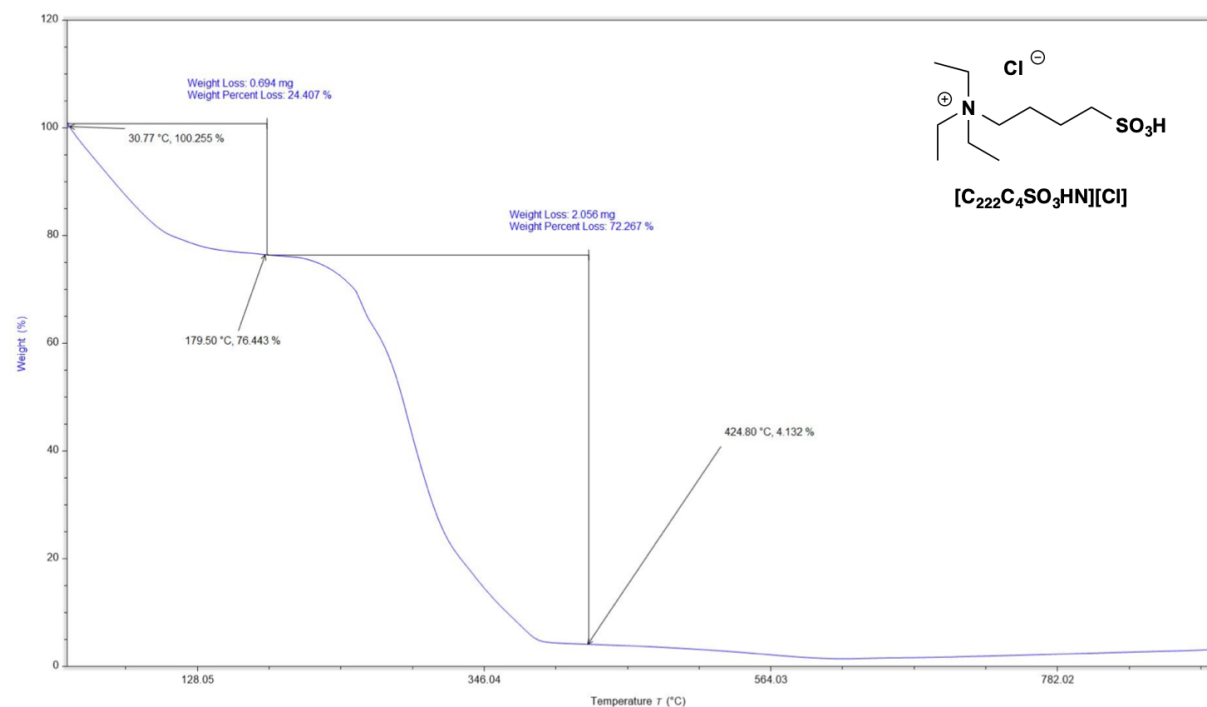
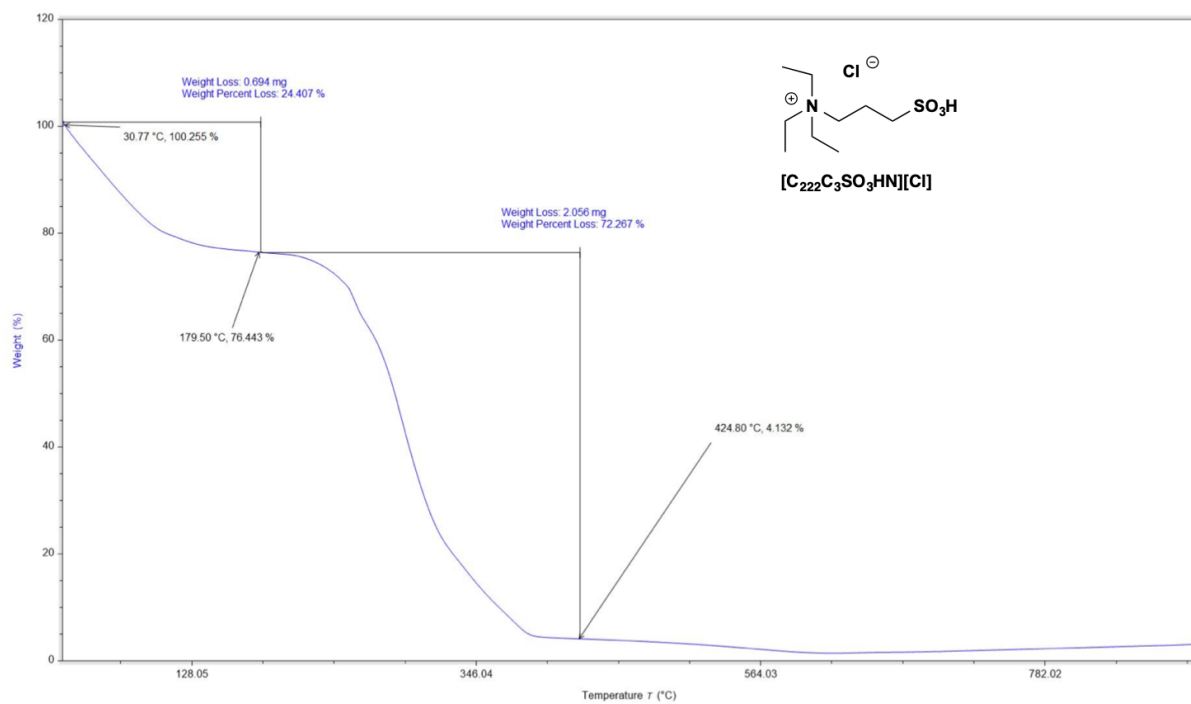
Supporting information for

Inulin Dehydration to 5-HMF in Deep Eutectic Solvents

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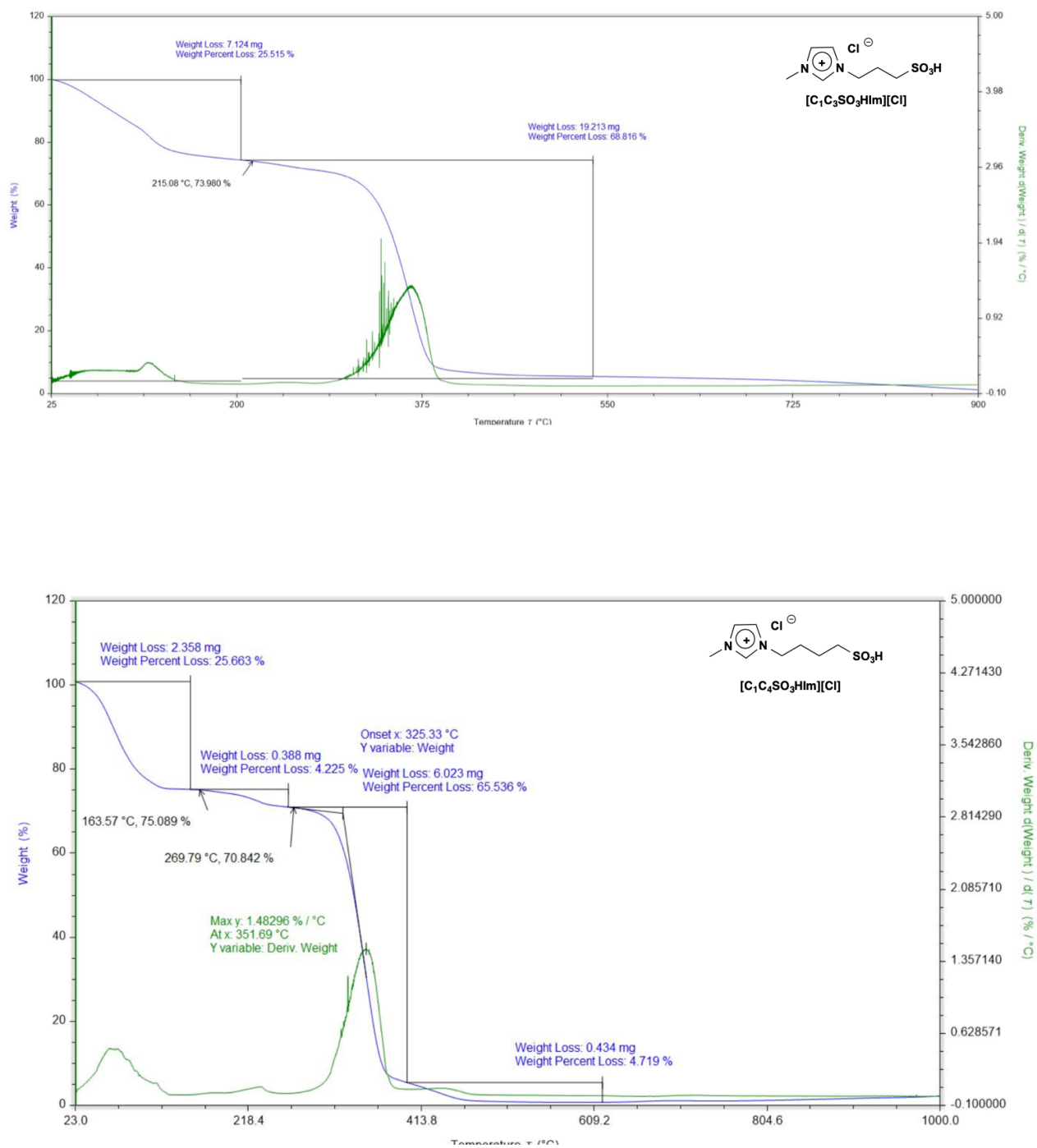
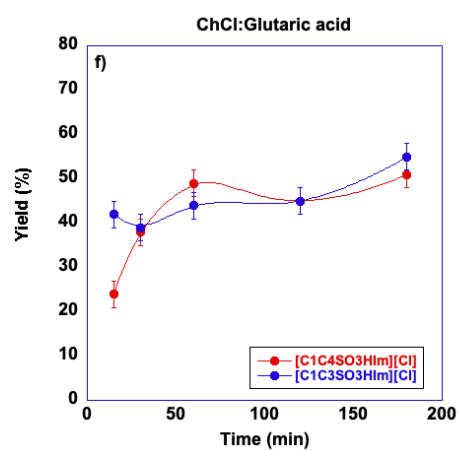
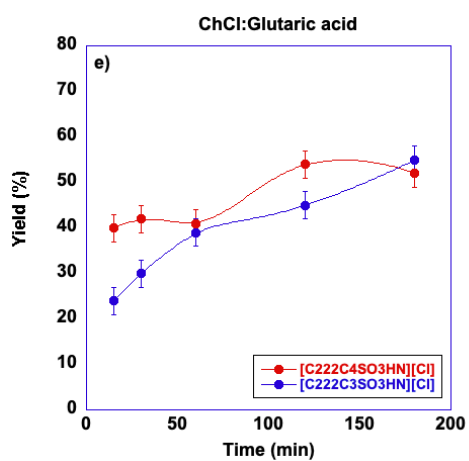
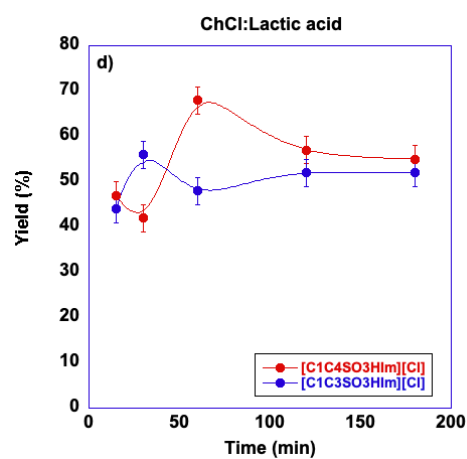
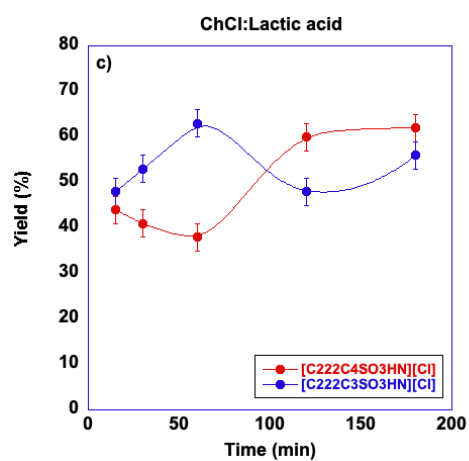
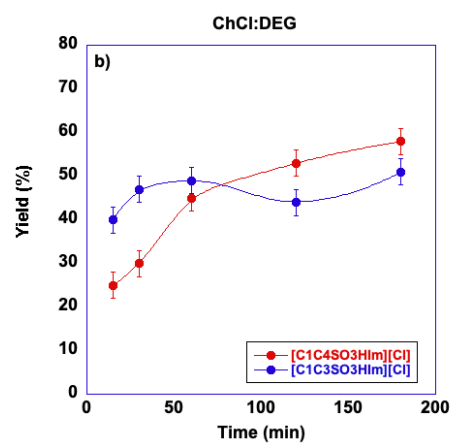
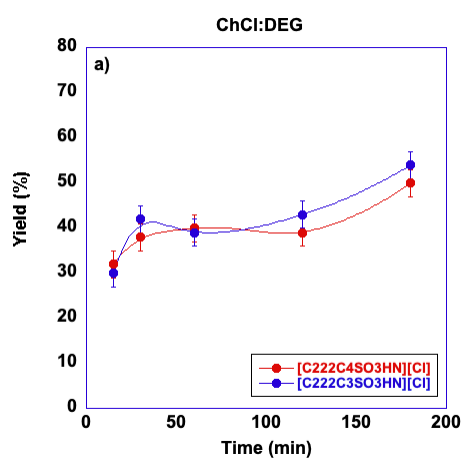


Figure S1. TGA traces for the catalysts employed.



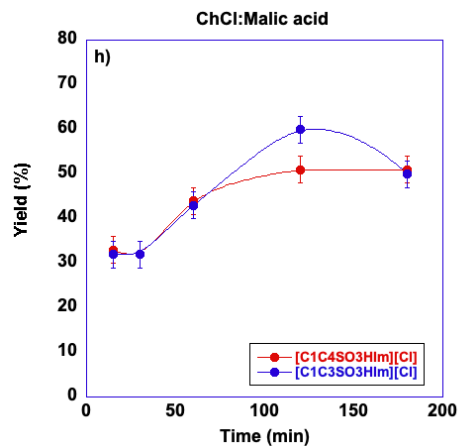
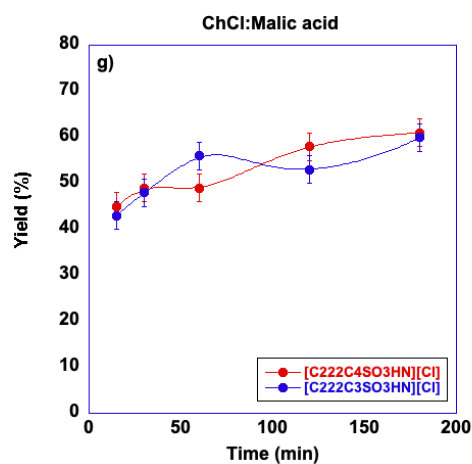
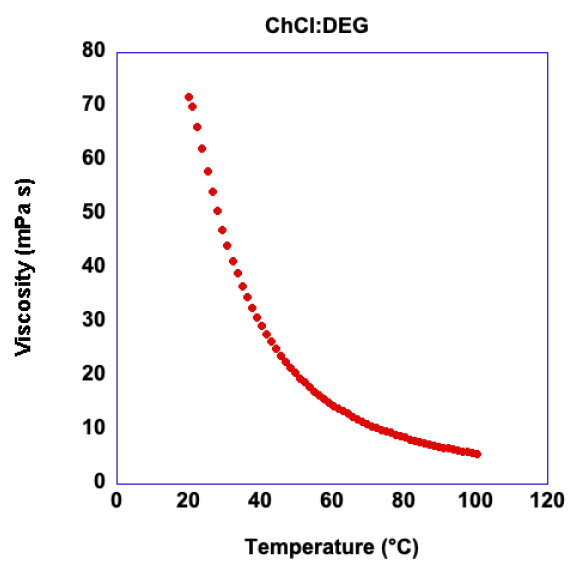
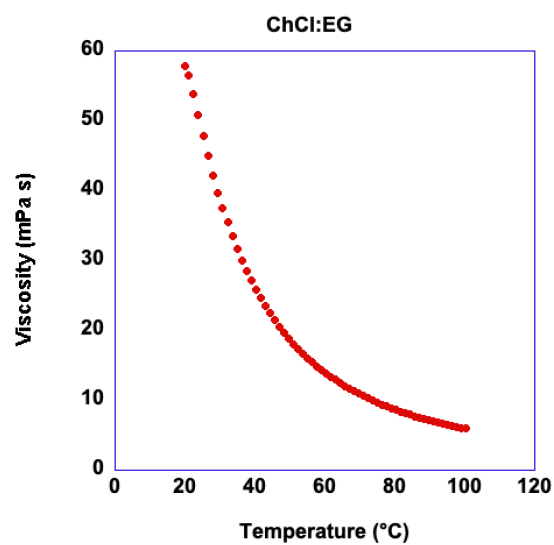
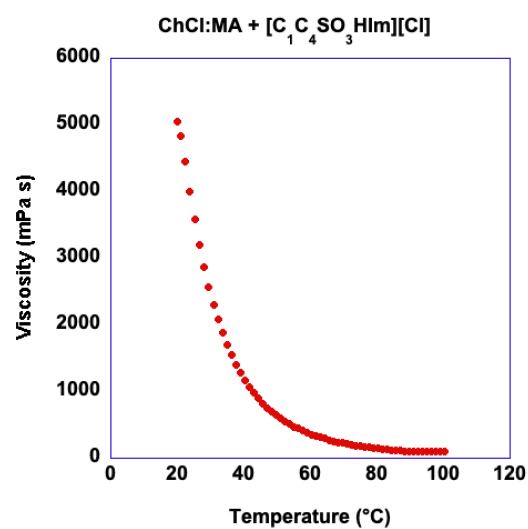
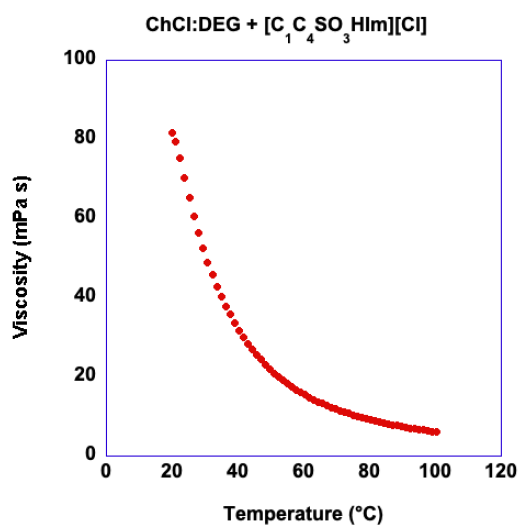
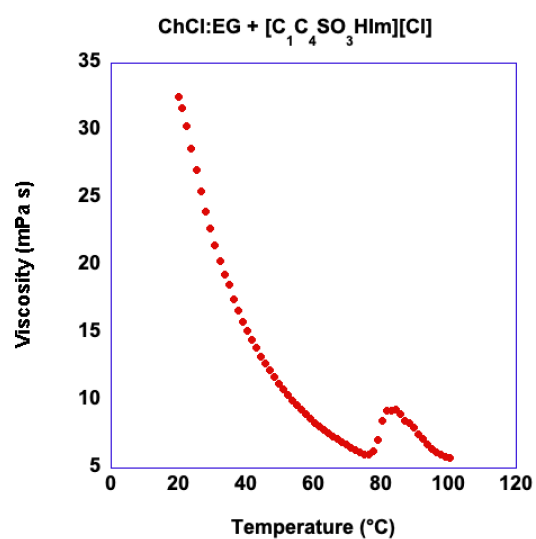
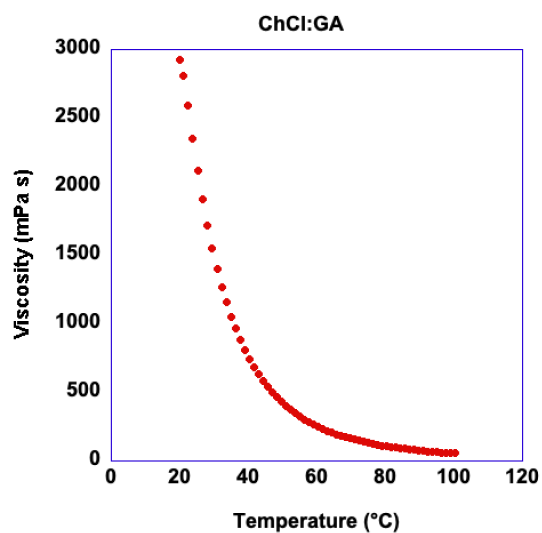
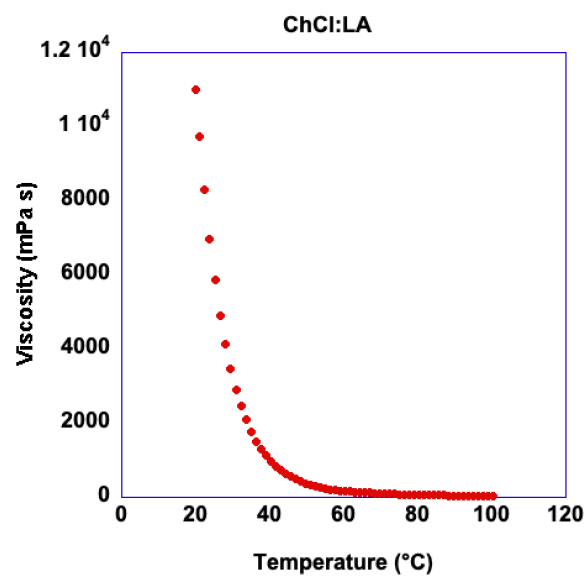
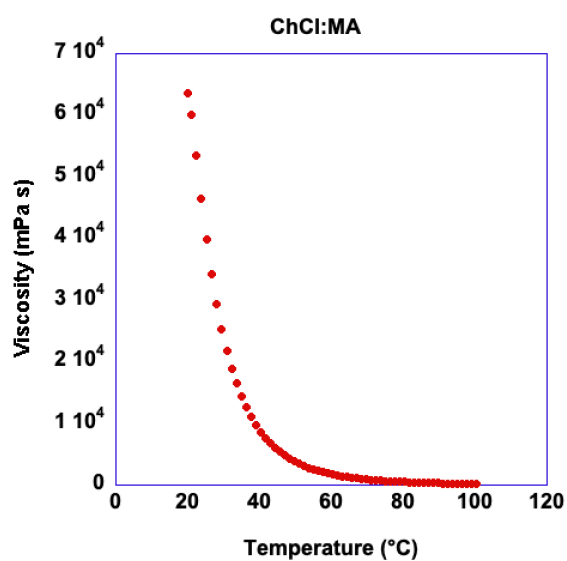


Figure S2. Plots of yield in 5-HMF from inulin at 80 °C, in different DES and in the presence of different acidic TSILs as catalysts.





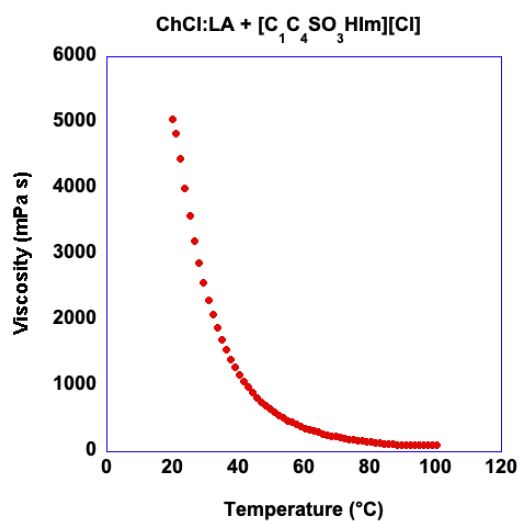


Figure S3. Plots temperature-dependent viscosity measurements for pure DES and solutions of the catalyst in solution of the DES considered.

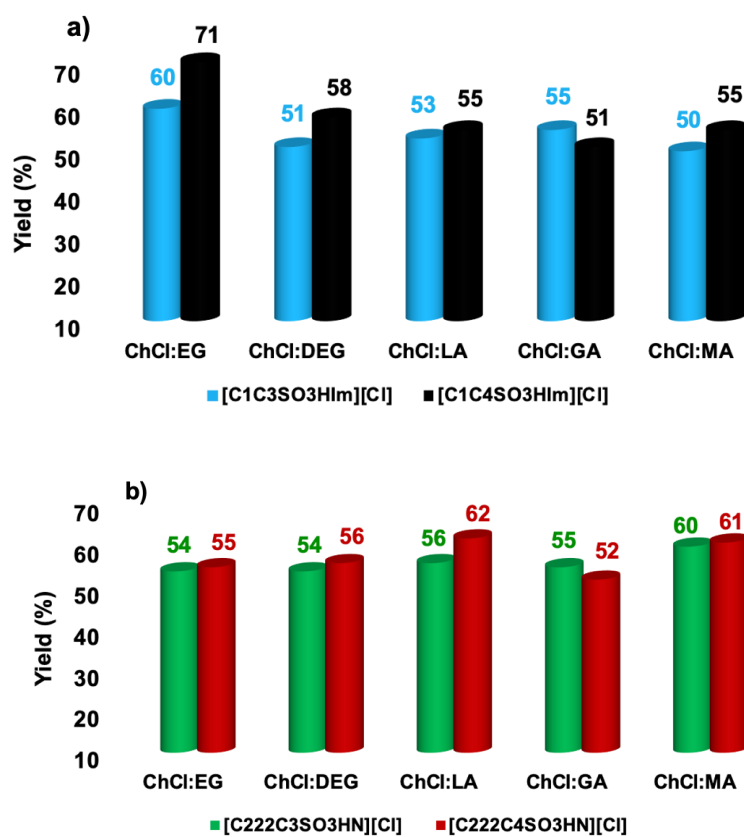
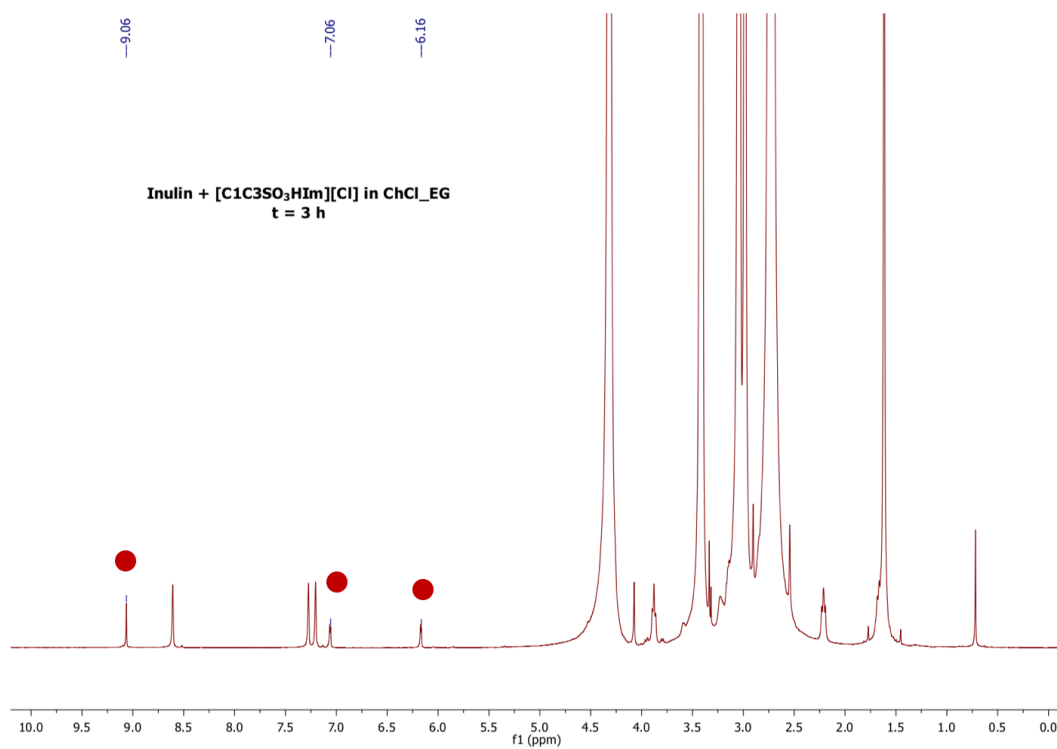
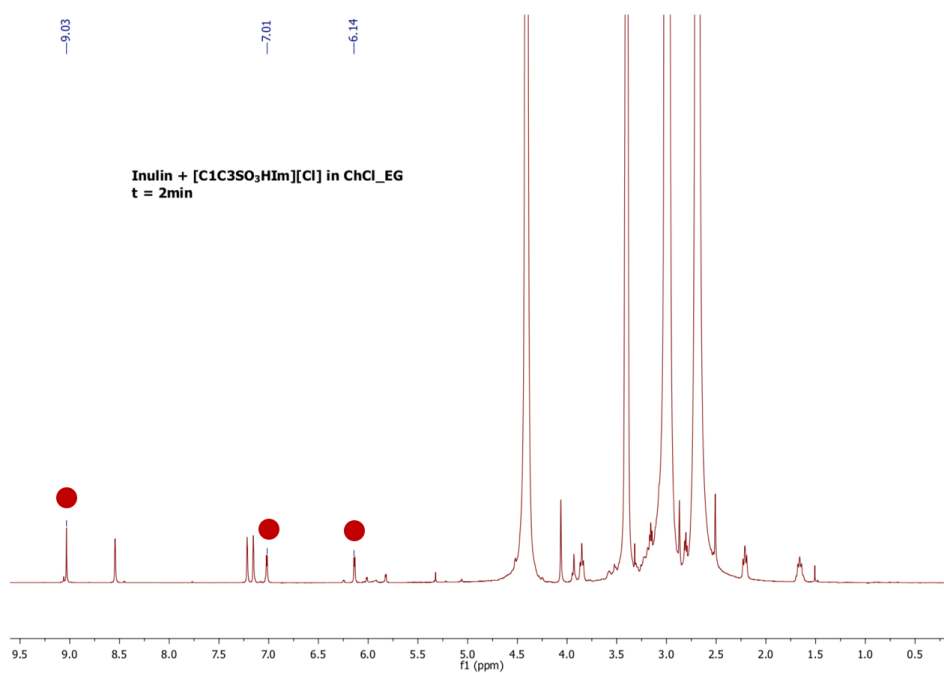
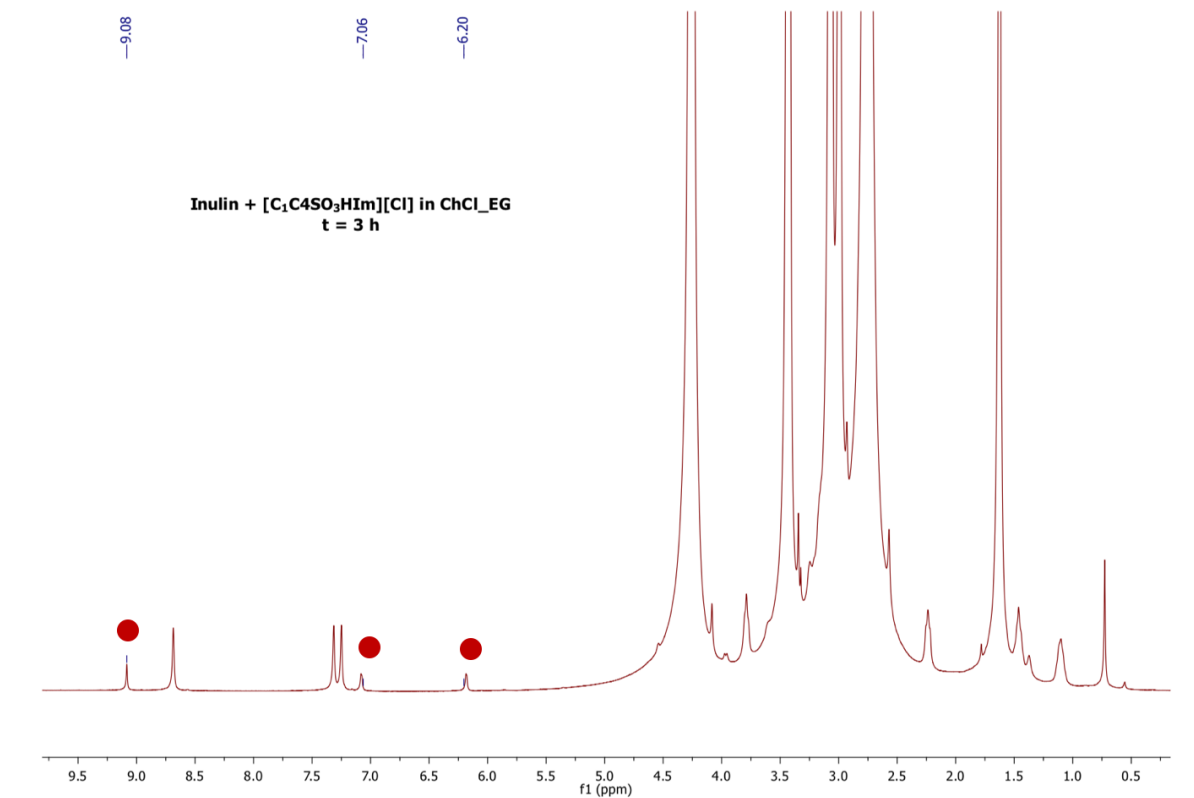
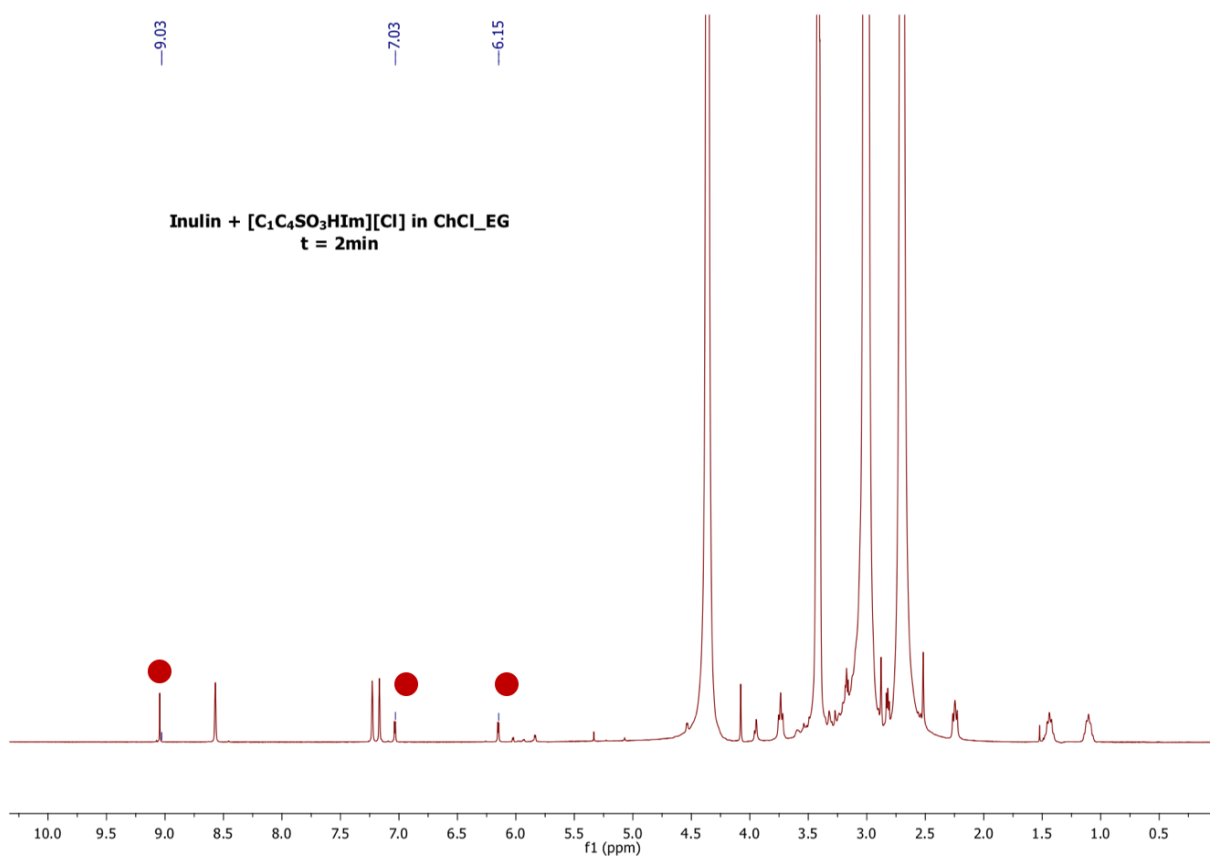
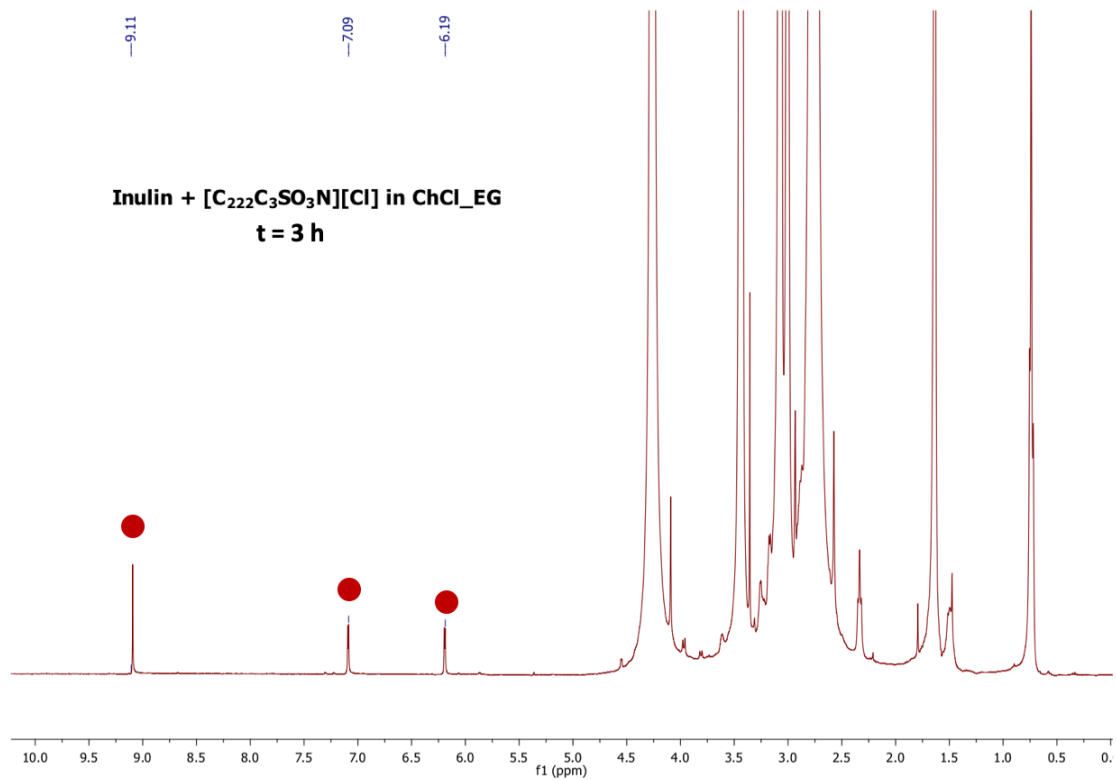
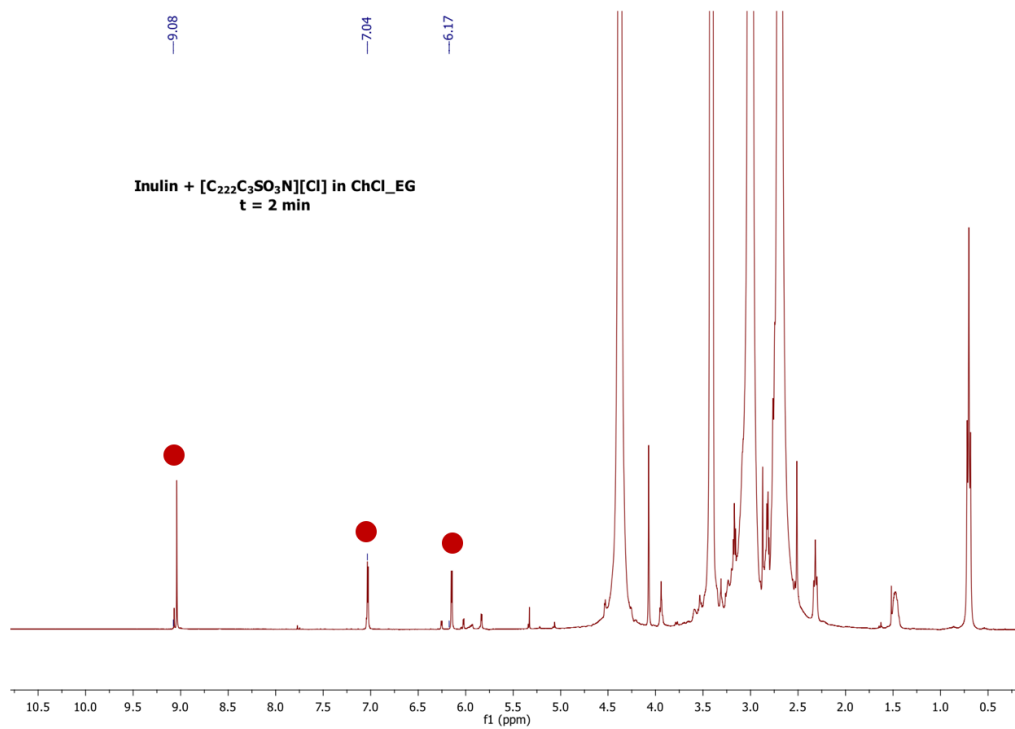


Figure S4. Plots of yields in 5-HMF obtained at 80 °C, 3h, in the presence of a) imidazolium- and b) ammonium-based TSILs, differing for the spacer length.







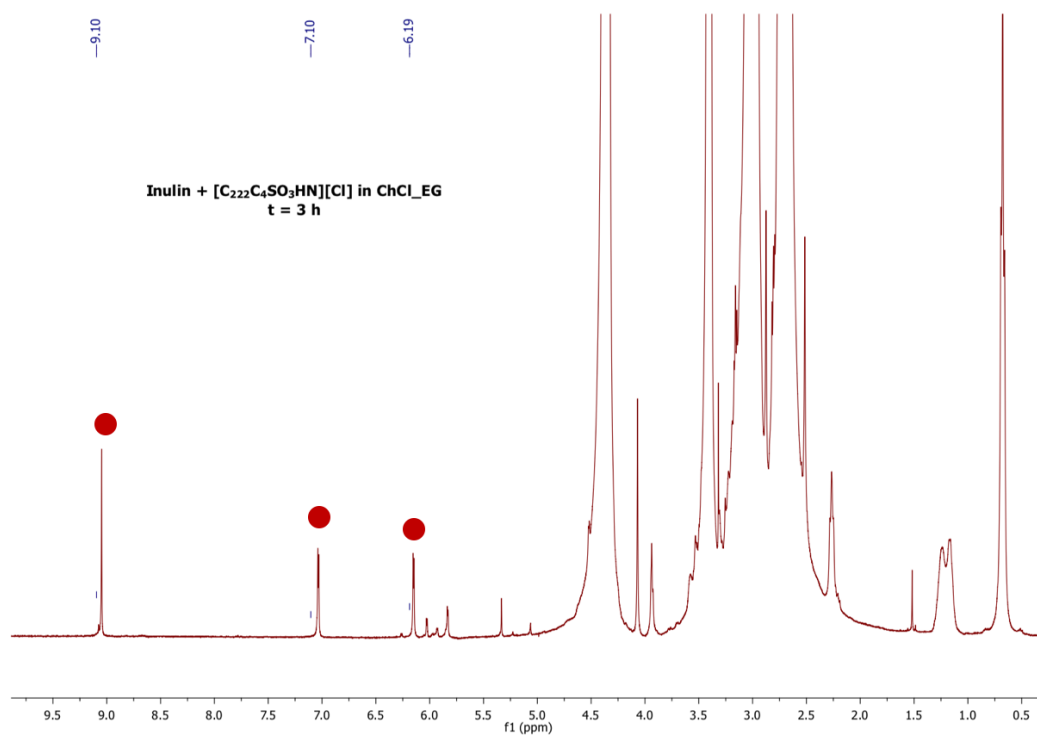
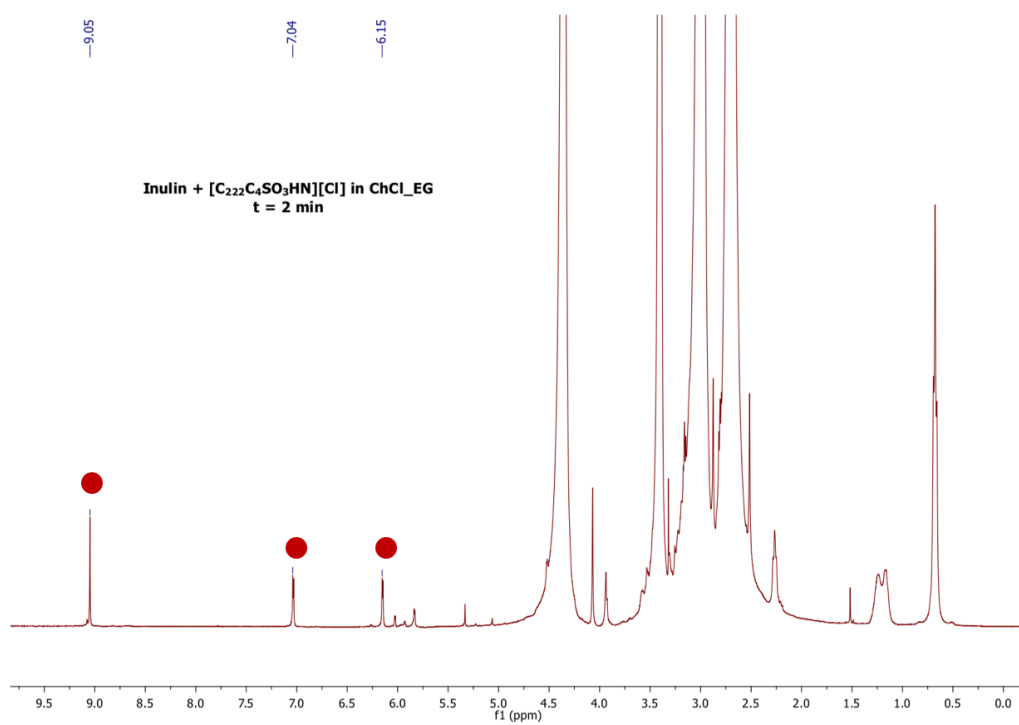


Figure S5. ¹H NMR spectra in D₆-DMSO of the reaction mixtures after 2 min and 3 h in ChCl:EG. Marked signals refer to protons of 5-HMF

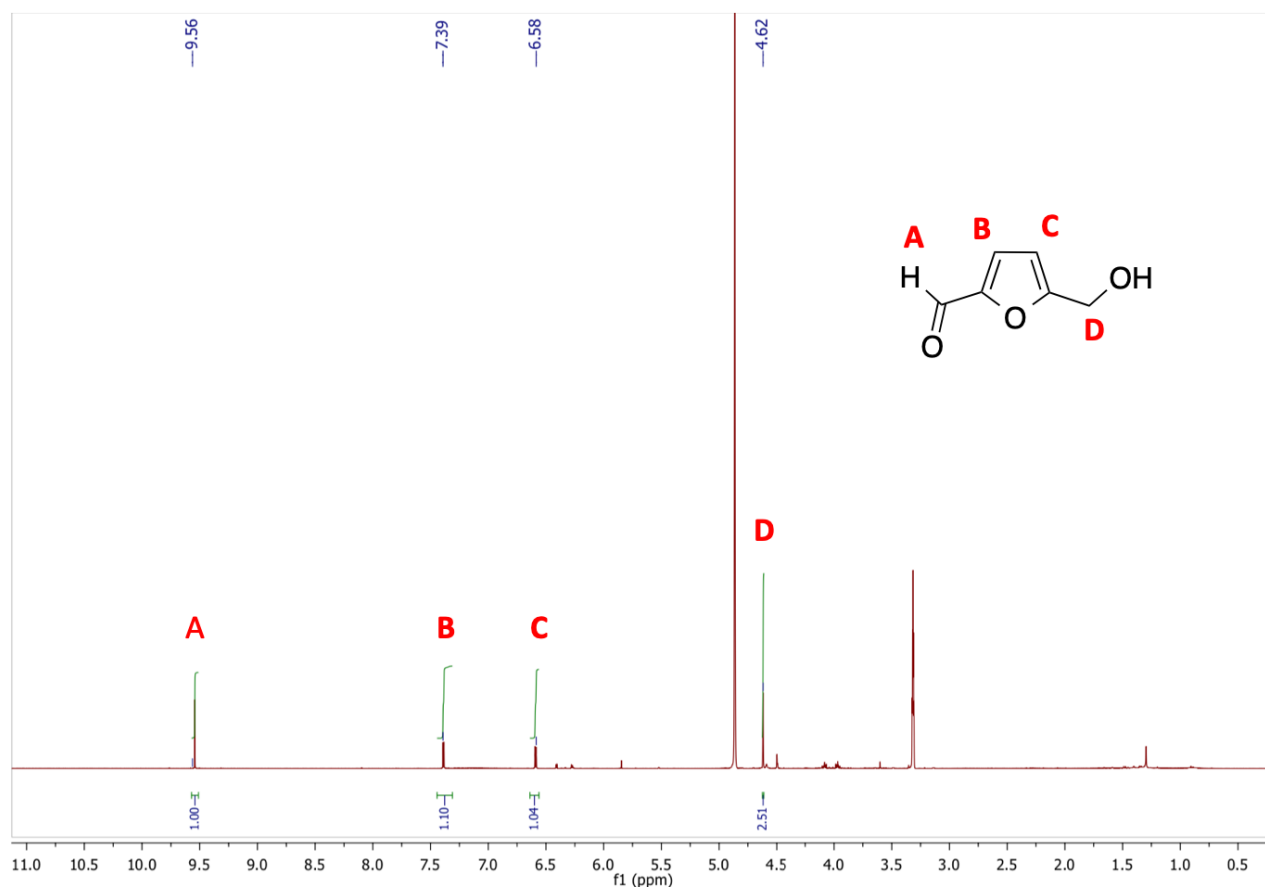


Figure S6. ^1H NMR spectrum in CD_3OD of 5-HMF isolated.

Table S1. Yields in 5-HMF for the dehydration of inulin at 80 °C, in ChCl:EG in the presence of acidic TSILs.^a

[C₂₂₂C₃SO₃HN][Cl]	
Time (min)	Yield in 5-HMF (%)
15	37
30	43
60	47
120	44
180	54
[C₂₂₂C₄SO₃HN][Cl]	
15	41
30	39
60	50
120	54
180	55
[C₁C₃SO₃HIm][Cl]	
15	49
30	44
60	57
120	60
180	60
[C₁C₄SO₃HIm][Cl]	
15	37
30	43
60	47
120	50
180	71

[a] Yields are reproducible within ± 4%.

Table S2. Yields in 5-HMF for the dehydration of inulin at 80 °C, in ChCl:DEG in the presence of acidic TSILs.^a

[C₂₂₂C₃SO₃HN][Cl]	
Time (min)	Yield in 5-HMF (%)
15	30
30	42
60	30
120	43
180	54
[C₂₂₂C₄SO₃HN][Cl]	
15	32
30	38
60	40
120	39
180	50
[C₁C₃SO₃HIm][Cl]	
15	40
30	47
60	49
120	44
180	51
[C₁C₄SO₃HIm][Cl]	
15	25
30	30
60	45
120	53
180	58

[a] Yields are reproducible within ± 4%.

Table S3. Yields in 5-HMF for the dehydration of inulin at 80 °C, in ChCl:LA in the presence of acidic TSILs.^a

[C₂₂₂C₃SO₃HN][Cl]	
Time (min)	Yield in 5-HMF (%)
15	48
30	53
60	63
120	48
180	56
[C₂₂₂C₄SO₃HN][Cl]	
15	44
30	41
60	38
120	60
180	62
[C₁C₃SO₃HIm][Cl]	
15	44
30	56
60	48
120	52
180	52
[C₁C₄SO₃HIm][Cl]	
15	47
30	42
60	68
120	57
180	55

[a] Yields are reproducible within $\pm 4\%$.

Table S4. Yields in 5-HMF for the dehydration of inulin at 80 °C, in ChCl:GA in the presence of acidic TSILs.^a

[C₂₂₂C₃SO₃HN][Cl]	
Time (min)	Yield in 5-HMF (%)
15	24
30	30
60	39
120	45
180	55
[C₂₂₂C₄SO₃HN][Cl]	
15	40
30	42
60	41
120	54
180	52
[C₁C₃SO₃HIm][Cl]	
15	42
30	39
60	44
120	45
180	55
[C₁C₄SO₃HIm][Cl]	
15	24
30	38
60	49
120	45
180	51

[a] Yields are reproducible within ± 4%.

Table S5. Yields in 5-HMF for the dehydration of inulin at 80 °C, in ChCl:MA in the presence of acidic TSILs.^a

[C₂₂₂C₃SO₃HN][Cl]	
Time (min)	Yield in 5-HMF (%)
15	43
30	48
60	56
120	53
180	60
[C₂₂₂C₄SO₃HN][Cl]	
15	45
30	49
60	49
120	58
180	61
[C₁C₃SO₃HI_m][Cl]	
15	32
30	32
60	43
120	60
180	50
[C₁C₄SO₃HI_m][Cl]	
15	36
30	34
60	50
120	56
180	55

[a] Yields are reproducible within ± 4%.