

Supplementary

Lignin-Derivative Ionic Liquids as Corrosion Inhibitors

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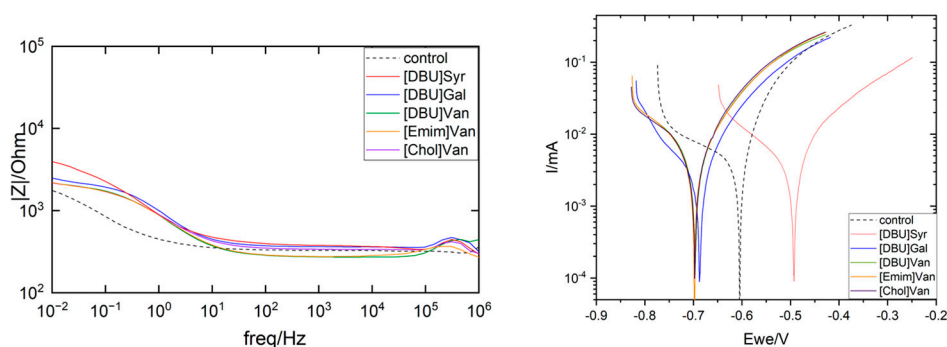


Figure S1 Bode plot (left) and Cyclic Potentiodynamic Polarization (right) results of AS1020 mild steel after 24h at OCV in control (0.01M NaCl; dotted line) and inhibited solutions (0.01M NaCl + 5 mM inhibitor).

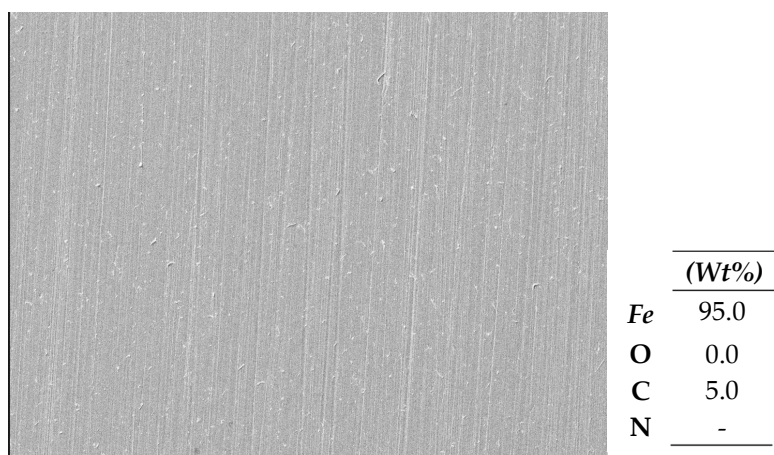


Figure S2 EDS data of pristine mild steel.

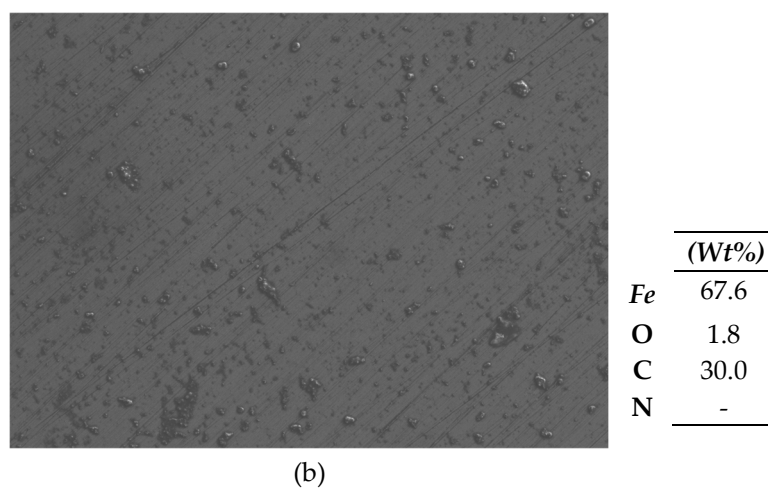
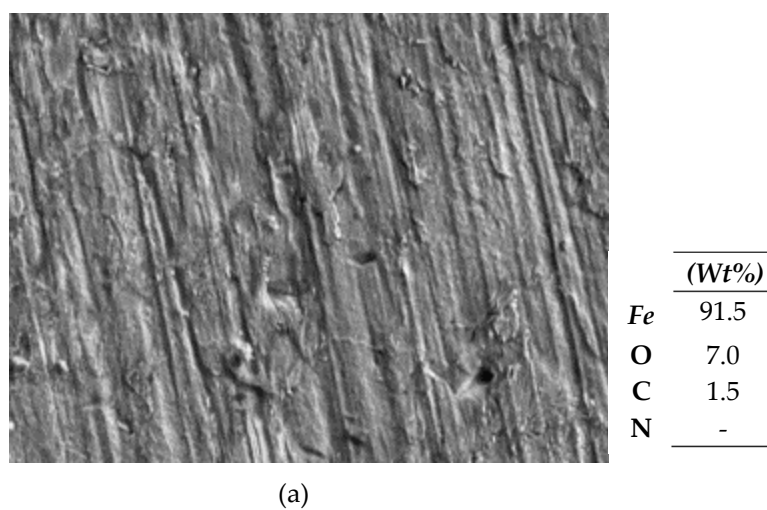
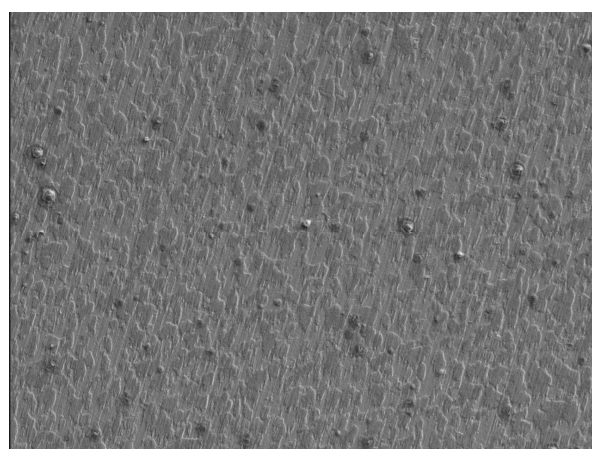
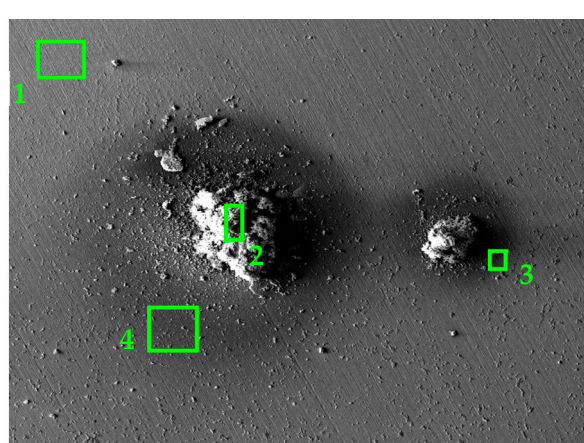


Figure S3 EDS data of mild steel immersed in 0.01M NaCl + [Emim]Gal 10 mM (a); 0.01M NaCl + [Emim]Syr 10 mM (b) after 24h.



	(Wt%)
Fe	91.4
O	3.1
C	5.0
N	0.5

(a)



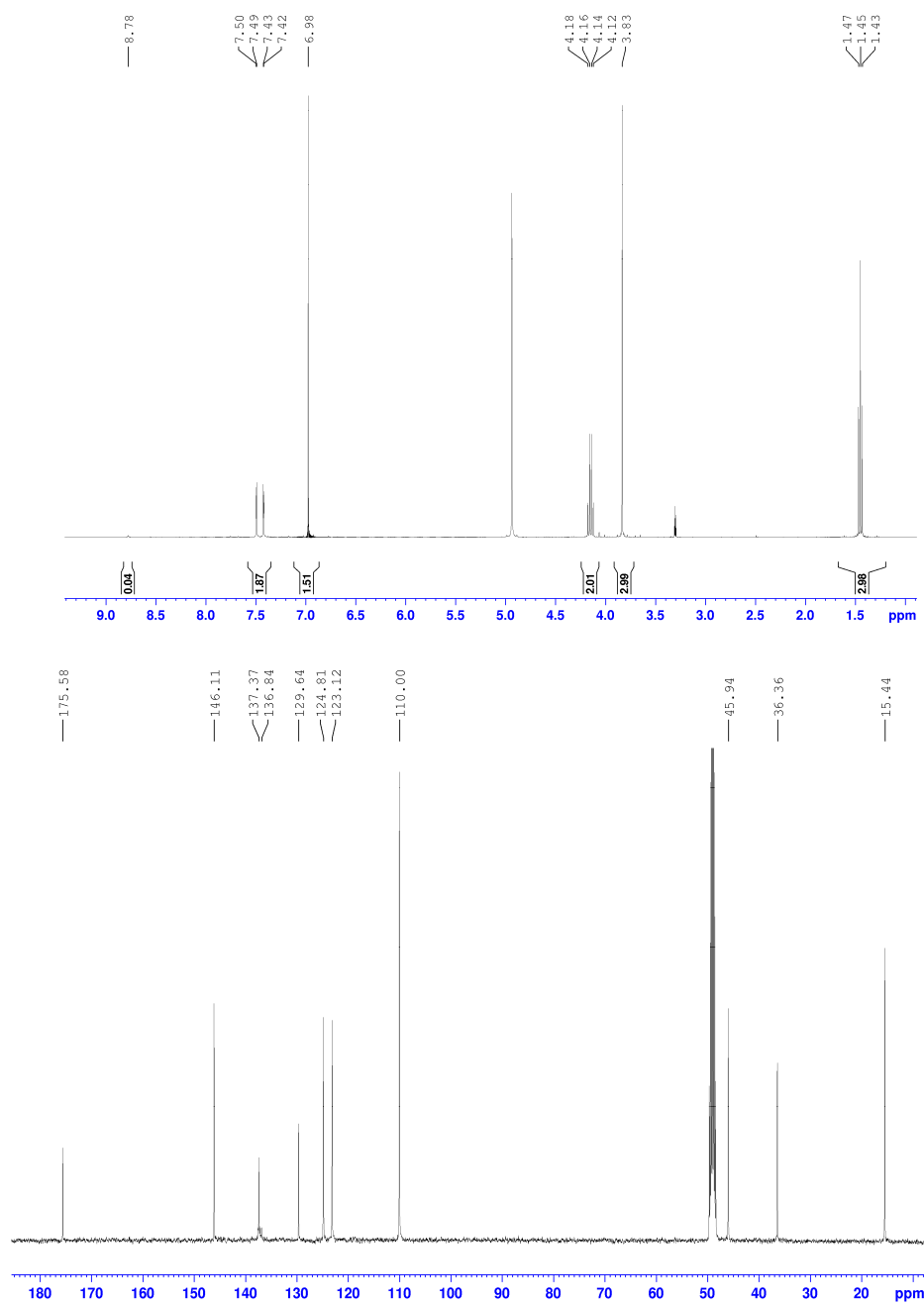
	1	2	3	4
	(Wt%)			
Fe	91.8	34.2	25.0	83.1
O	1.0	24.3	25.6	8.3
C	6.5	36.0	45.1	8.1
N	0.7	5.3	4.2	0.4

(b)

Figure S4 EDS data of 3 different zones (1,4: mild steel surface; 2,3: inhibitor deposits) of mild steel immersed in 0.01M NaCl + [Chol]Gal 10 mM (b); 0.01M NaCl + [Chol]Syr 10 mM (b) after 24h.

Table S1. Average area roughness of mild steel samples immersed in the inhibited solutions containing 0.01M NaCl and the inhibitor 10 mM, compared to pristine control immersed in 0.01M NaCl.

	Sa (μm)	σ
Pristine control	0.101	0.005
[Emim]Gal	0.27	0.04
[Emim]Syr	0.24	0.03
[Chol]Gal	0.161	0.004
[Chol]Syr	0.109	0.007

**Figure S5** ^1H NMR and ^{13}C NMR spectra of [Emim]Gal

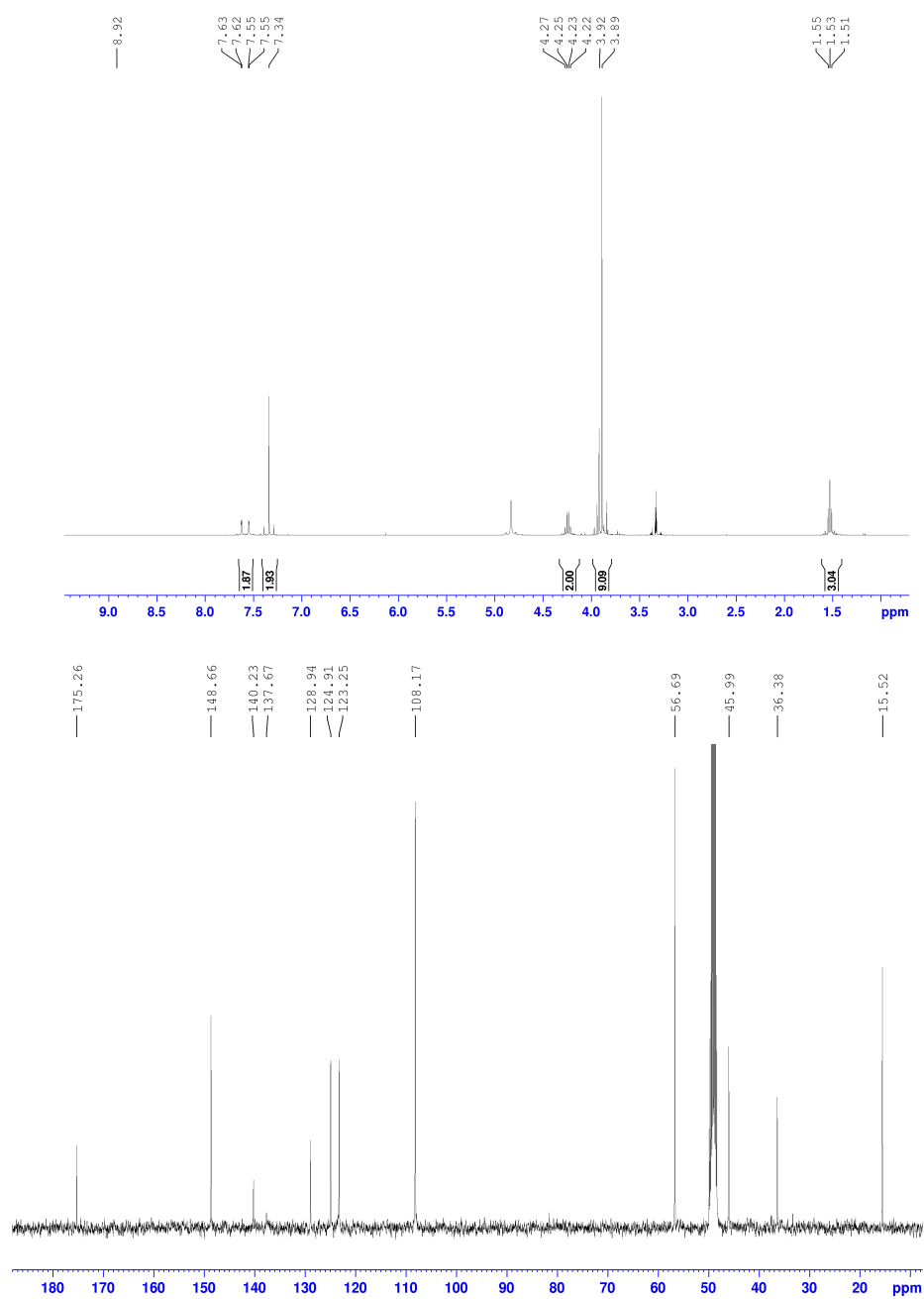


Figure S6 ^1H NMR and ^{13}C NMR spectra of [Emim]Syr

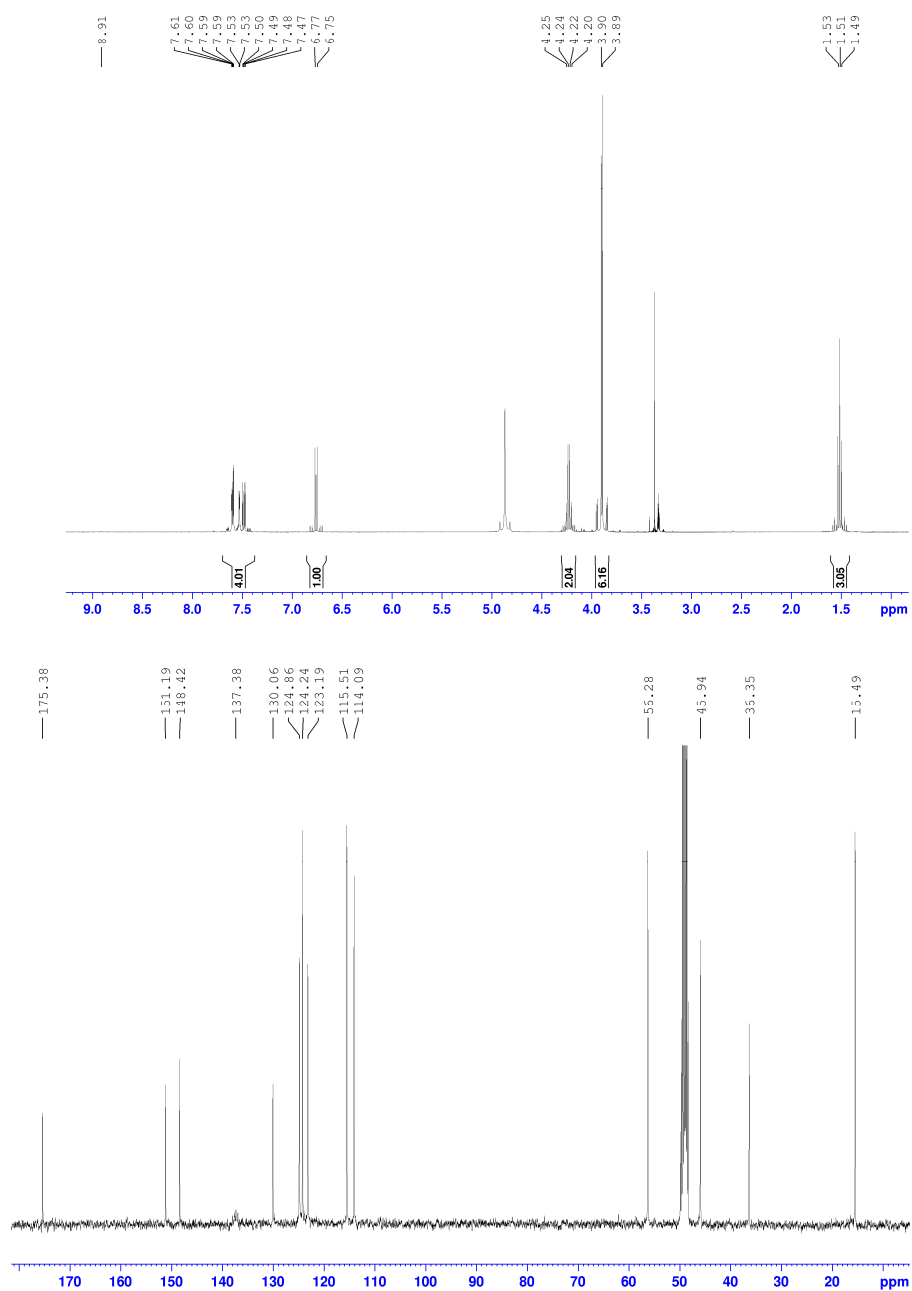


Figure S7 ^1H NMR and ^{13}C NMR spectra of [Emim]Van

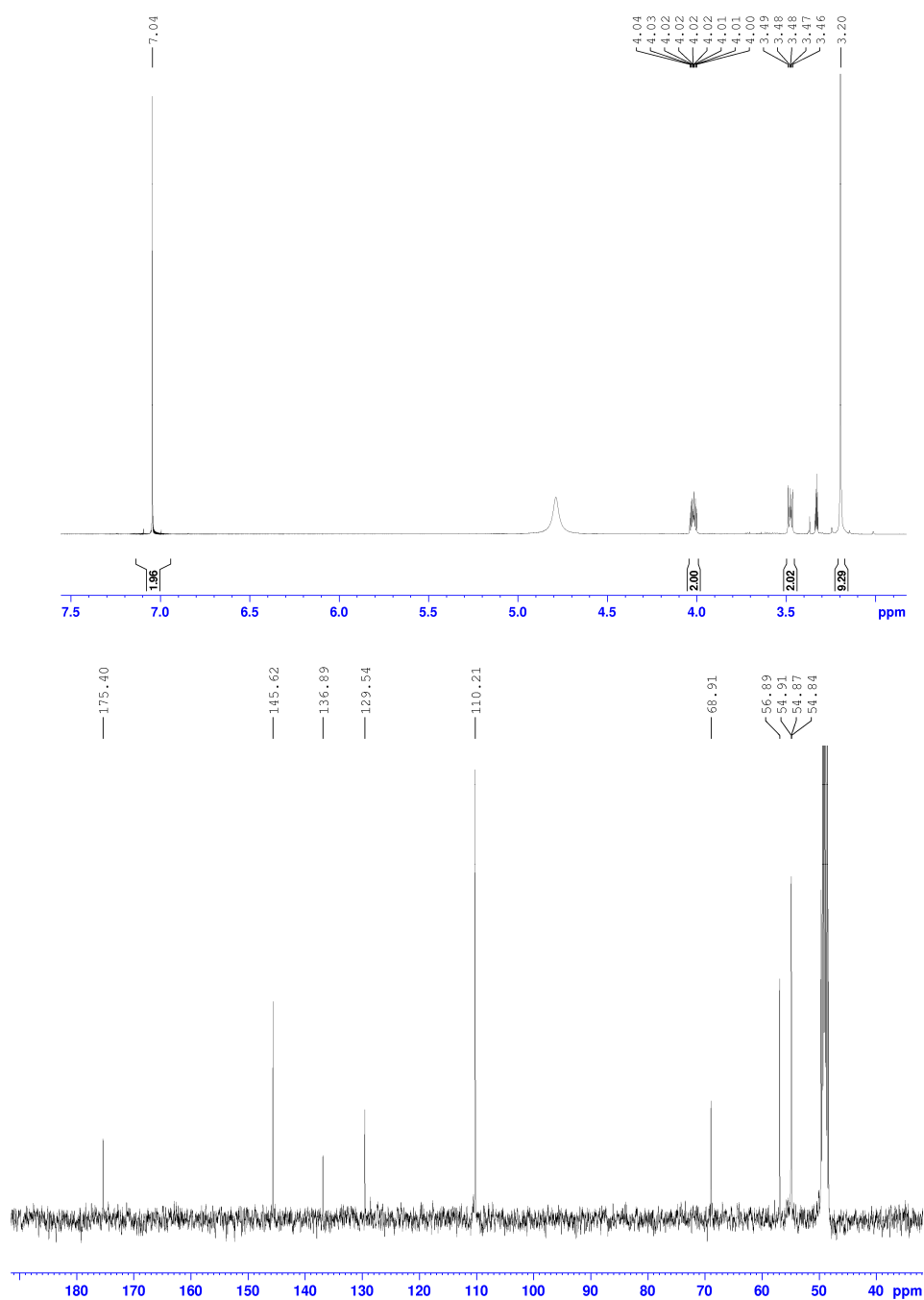


Figure S8 ^1H NMR and ^{13}C NMR spectra of [Chol]Gal

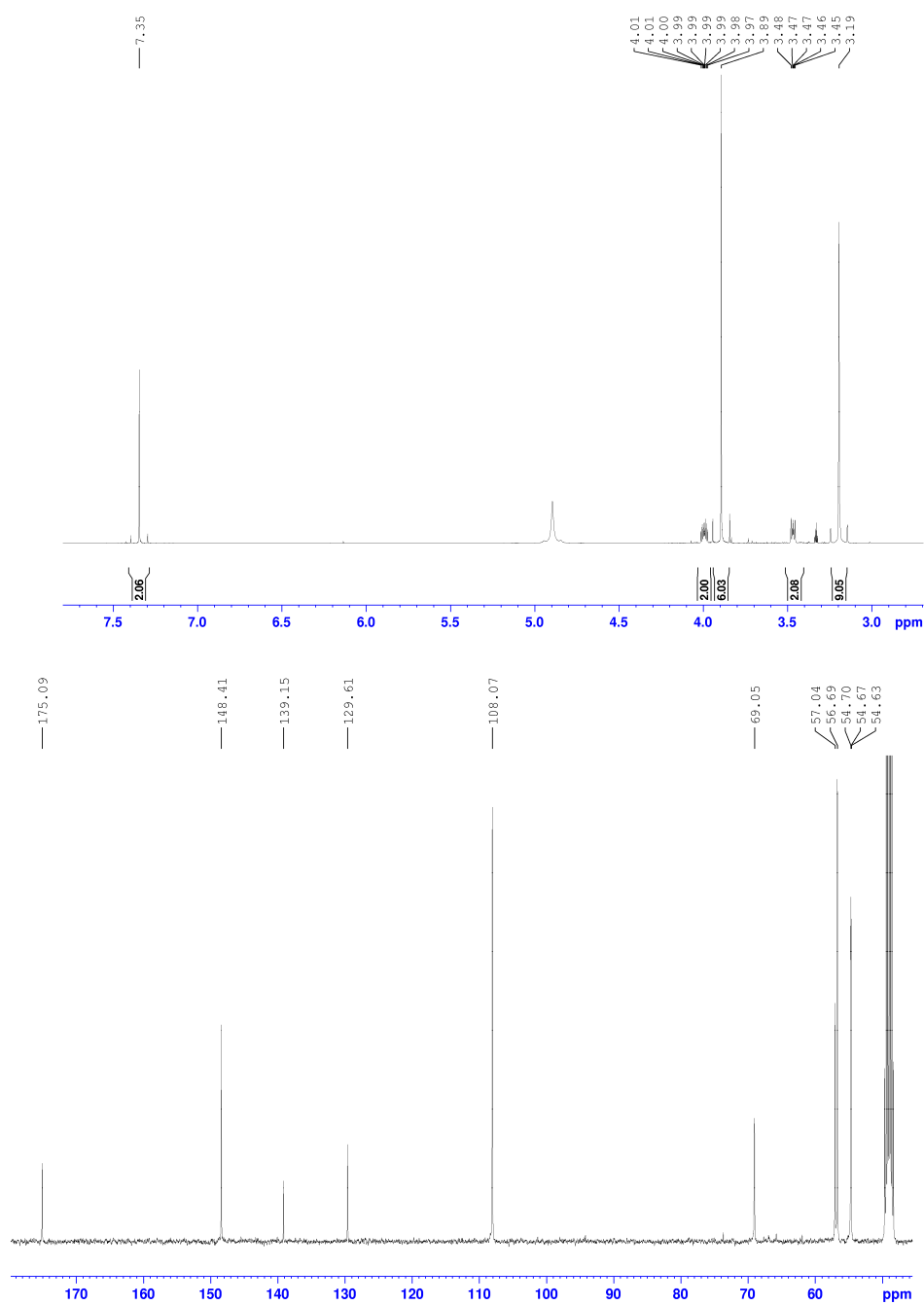


Figure S9 ^1H NMR and ^{13}C NMR spectra of [Chol]Syr

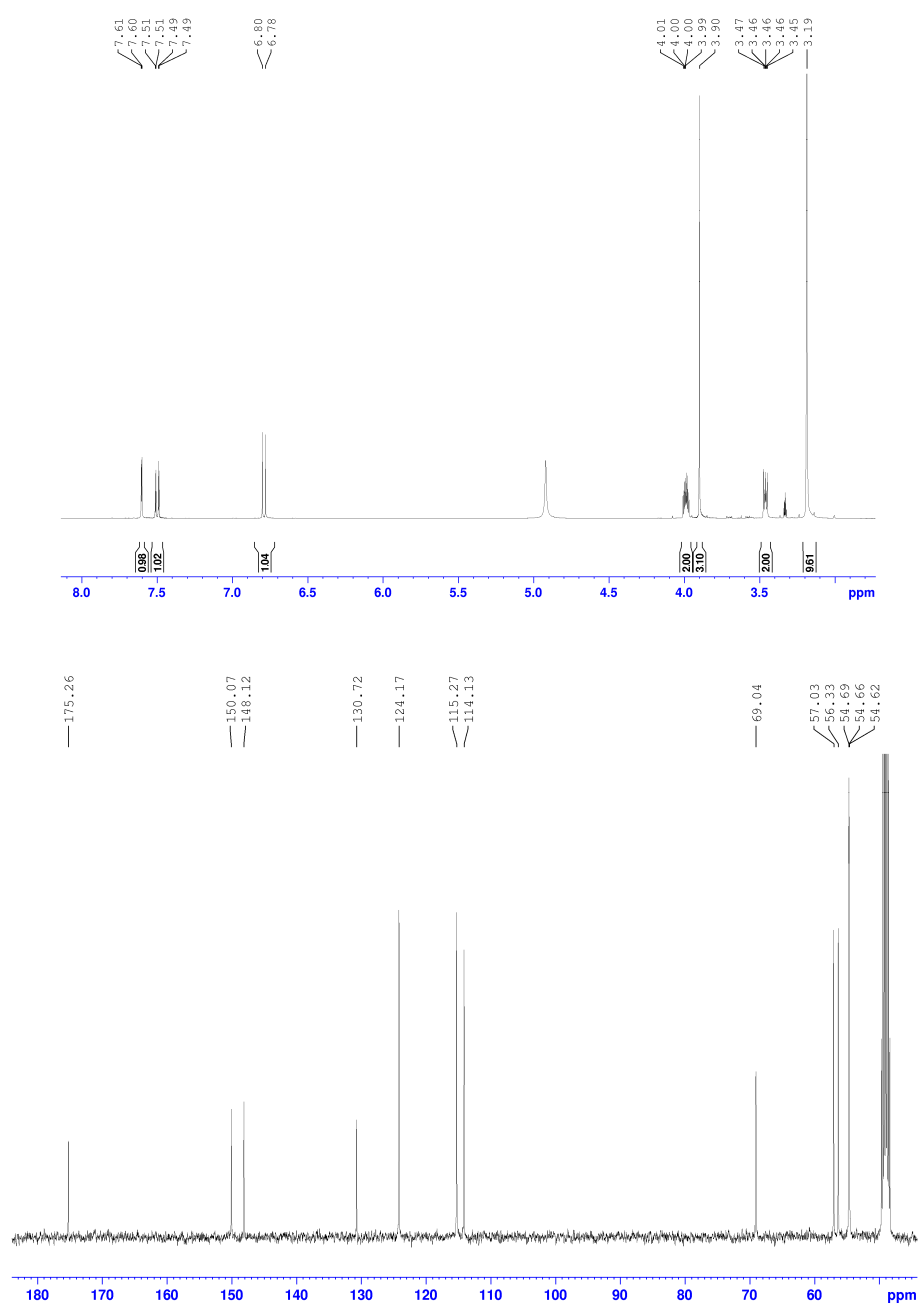


Figure S10 ^1H NMR and ^{13}C NMR spectra of [Chol]Van

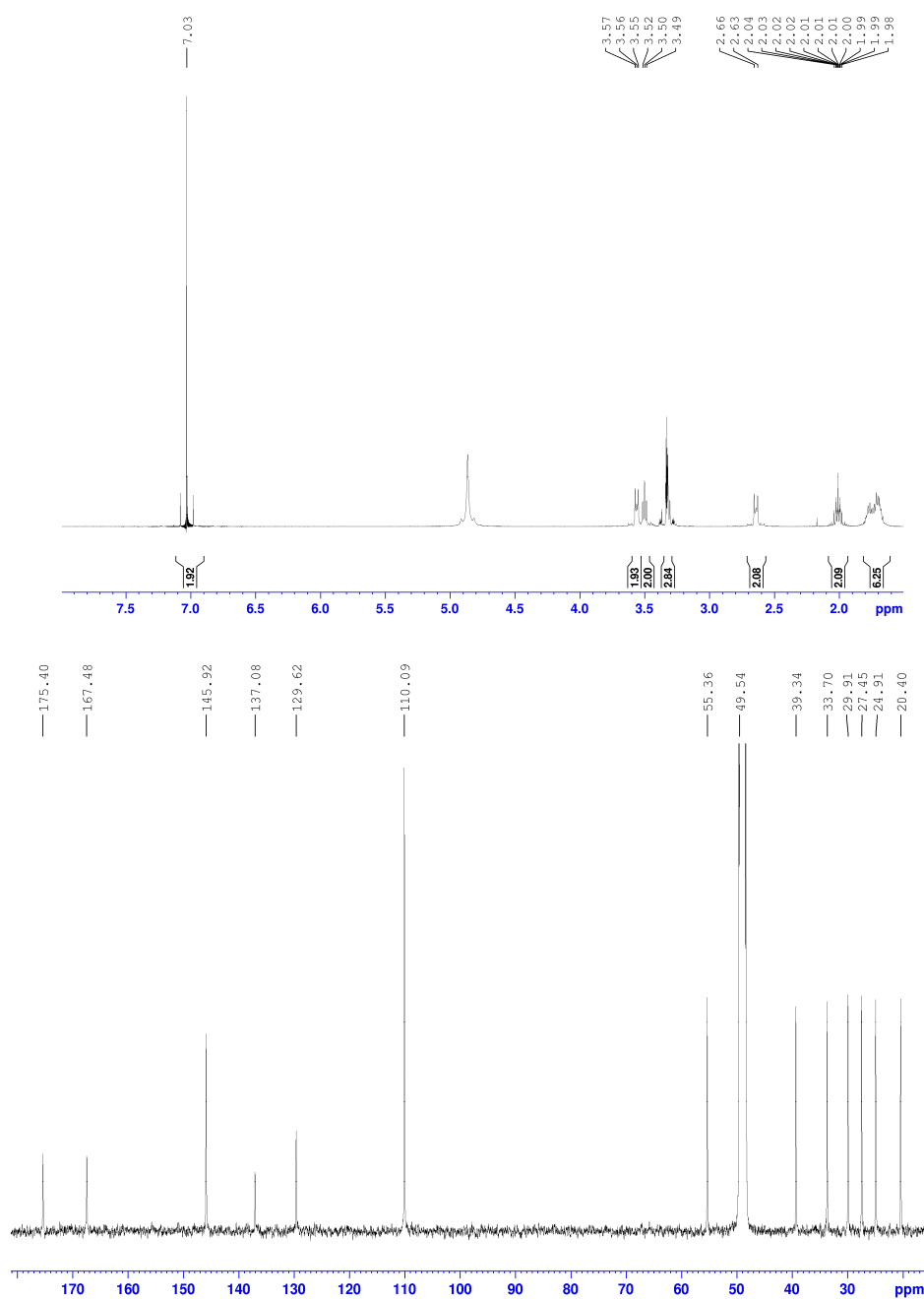


Figure S11 ^1H NMR and ^{13}C NMR spectra of [DBU]Gal

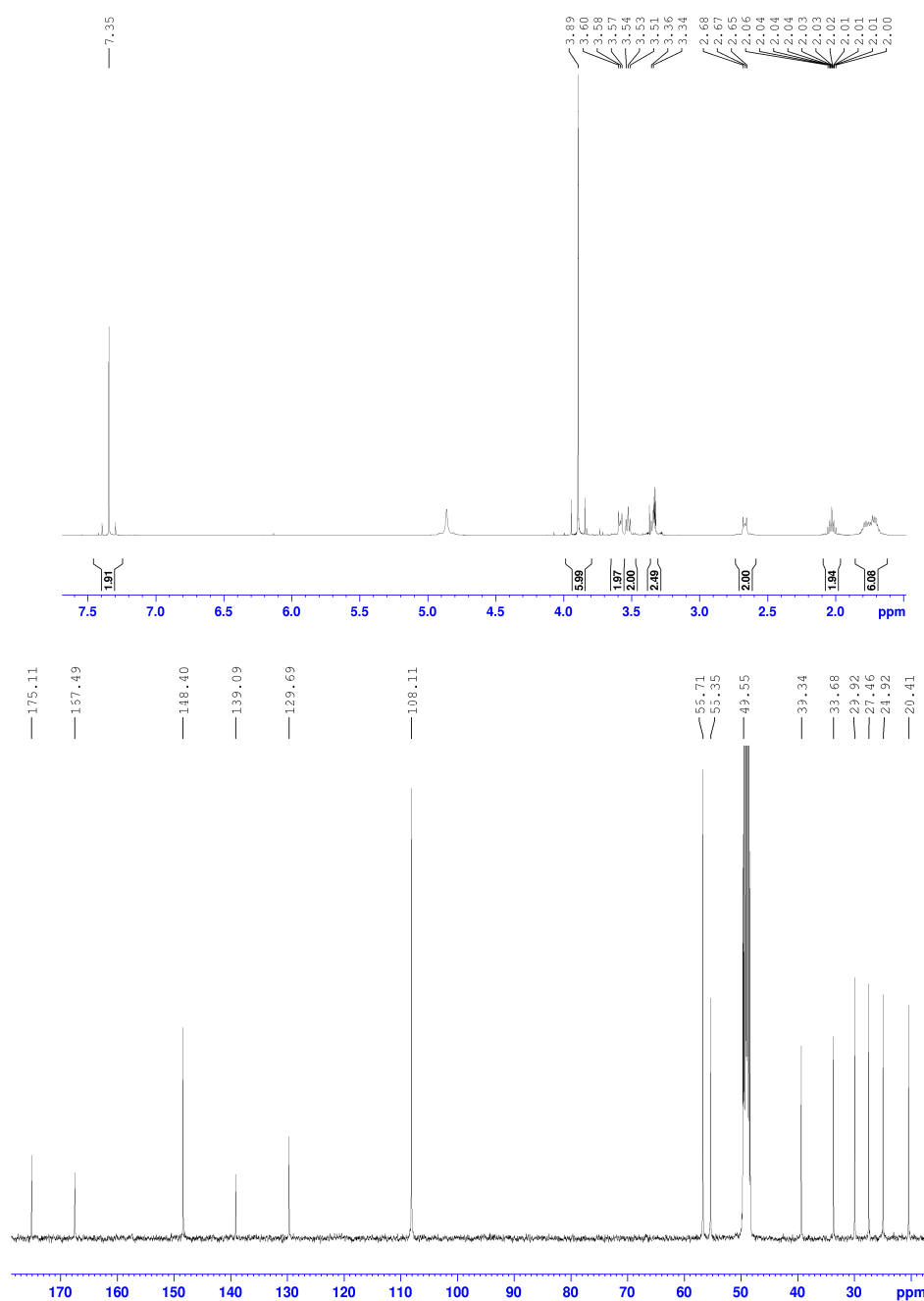
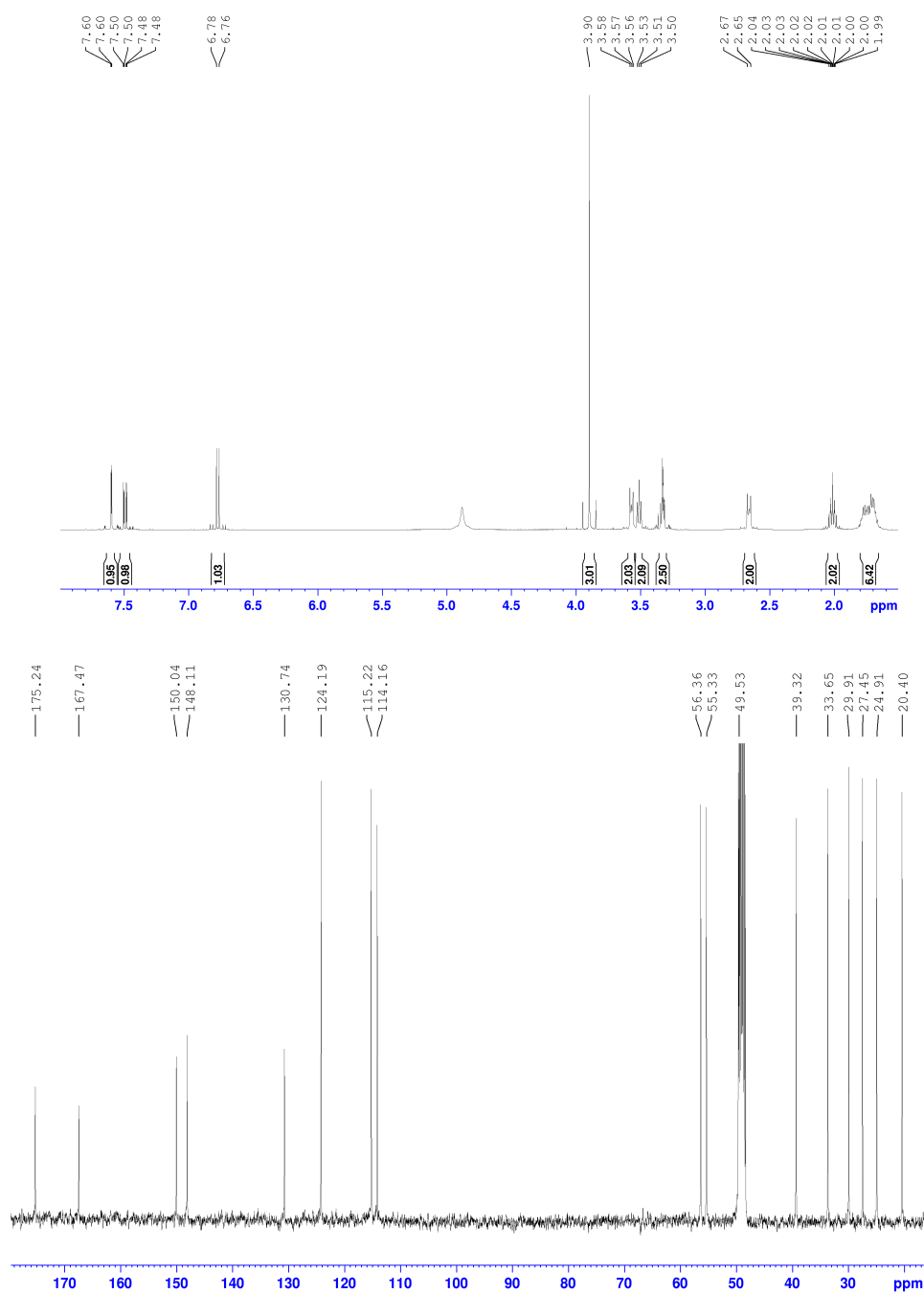


Figure S12 ^1H NMR and ^{13}C NMR spectra of [DBU]Syr

**Figure S13** ^1H NMR and ^{13}C NMR spectra of [DBU]Van

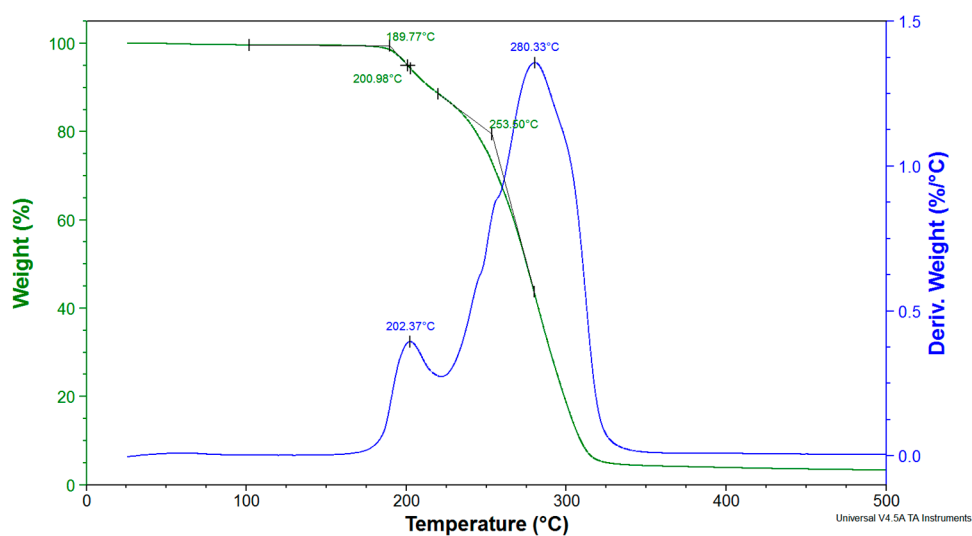


Figure S14 Thermogravimetric and derivative curves of [Emim]Gal

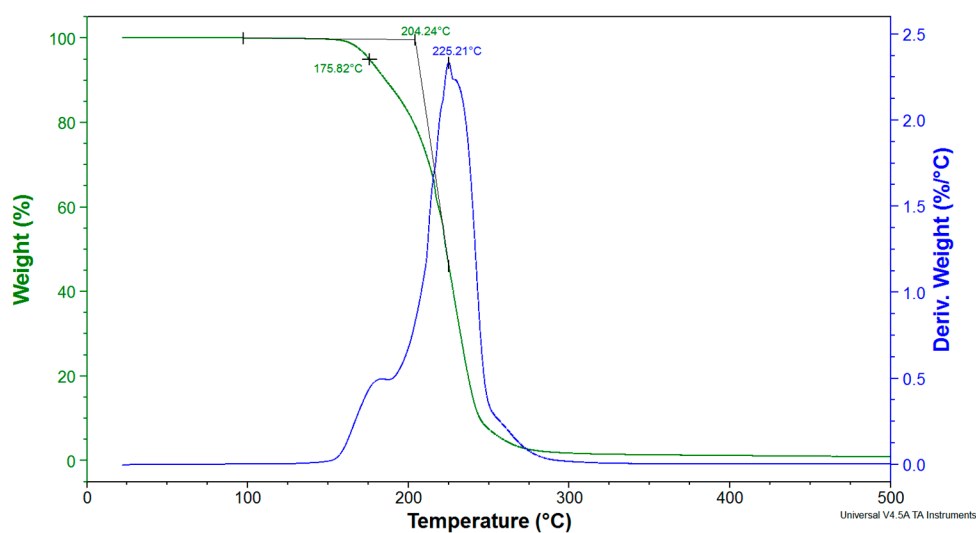


Figure S15 Thermogravimetric and derivative curves of [Emim]Syr

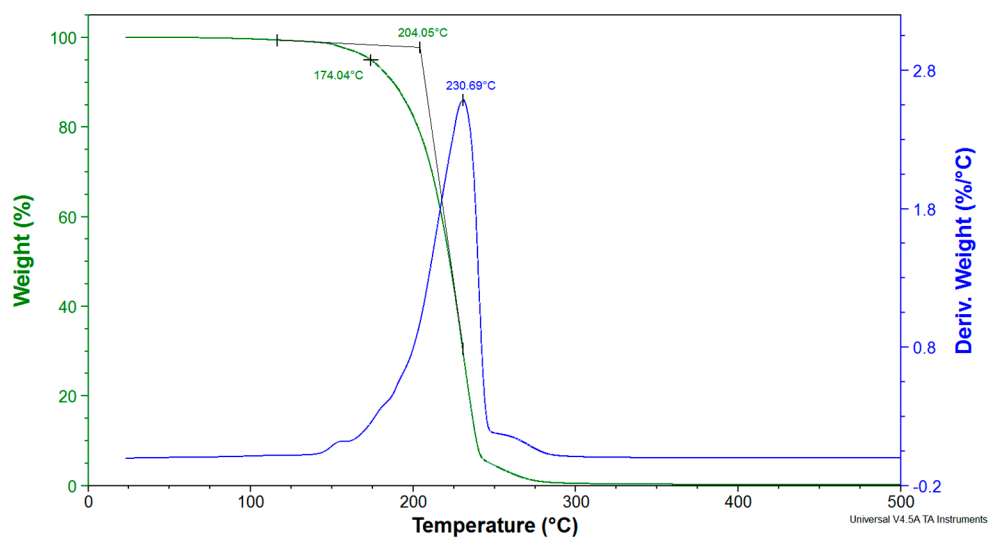


Figure S16 Thermogravimetric and derivative curves of [Emim]Van

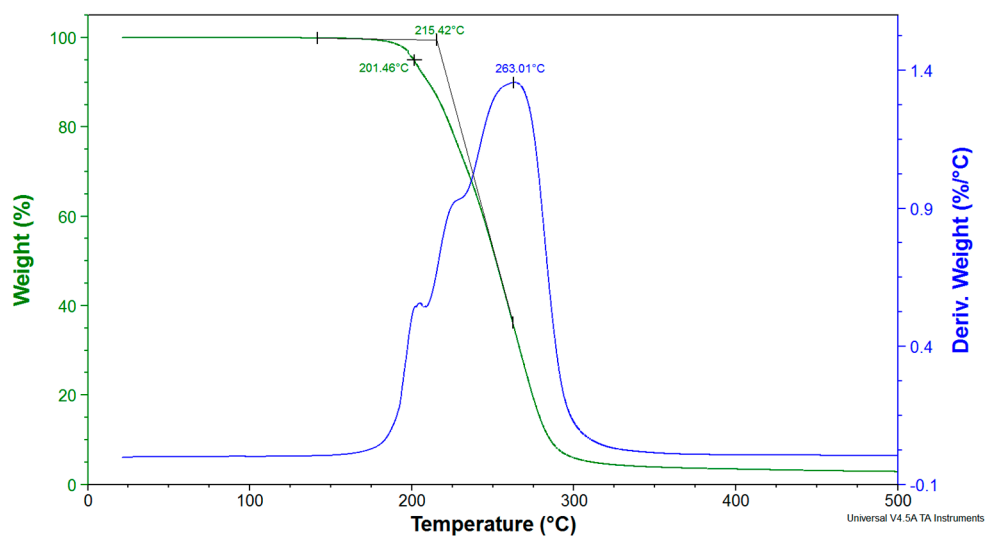


Figure S17 Thermogravimetric and derivative curves of [Chol]Gal

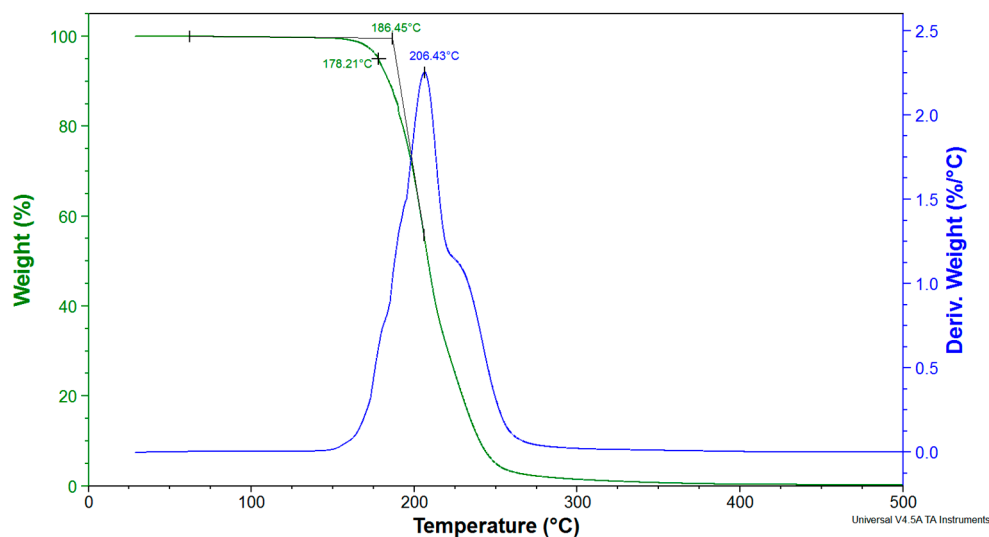


Figure S18 Thermogravimetric and derivative curves of [Chol]Syr

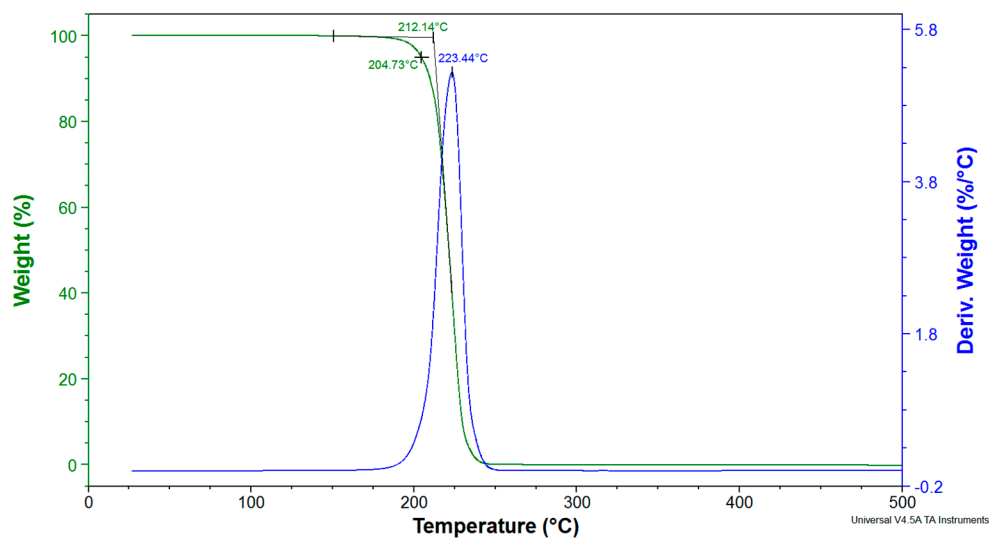


Figure S19 Thermogravimetric and derivative curves of [Chol]Van

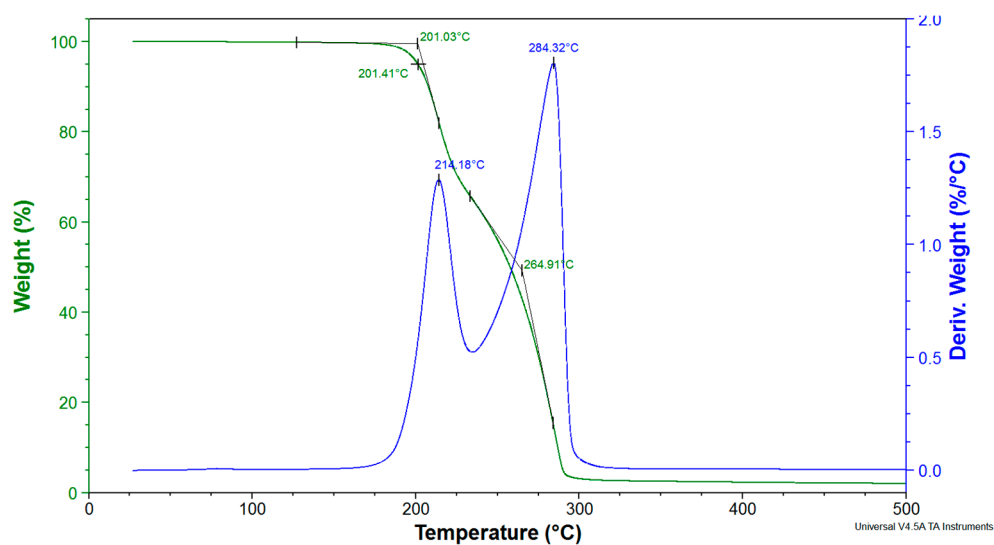


Figure S20 Thermogravimetric and derivative curves of [DBU]Gal

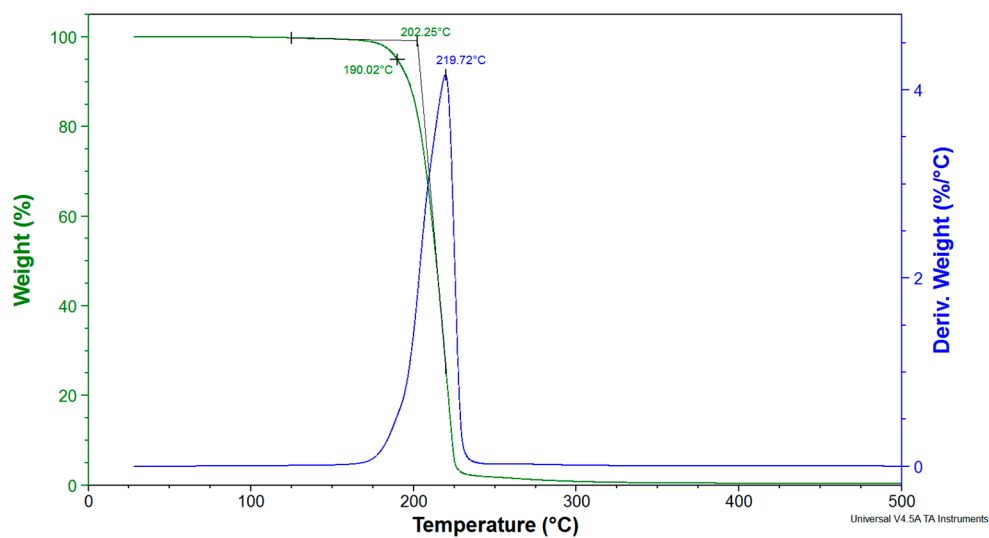


Figure S21 Thermogravimetric and derivative curves of [DBU]Syr

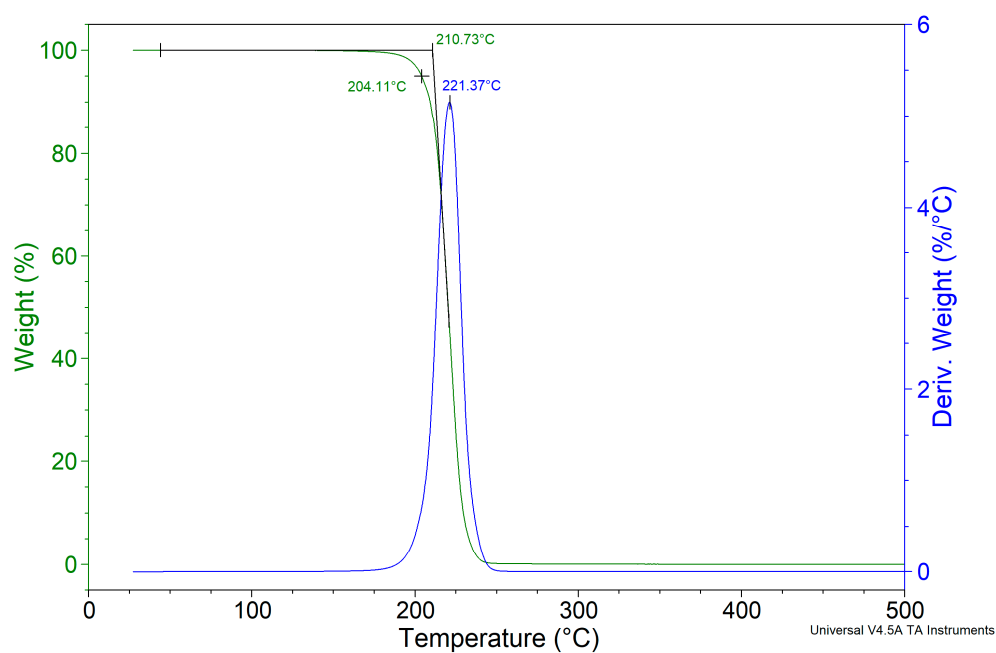


Figure S22 Thermogravimetric and derivative curves of [DBU]Van

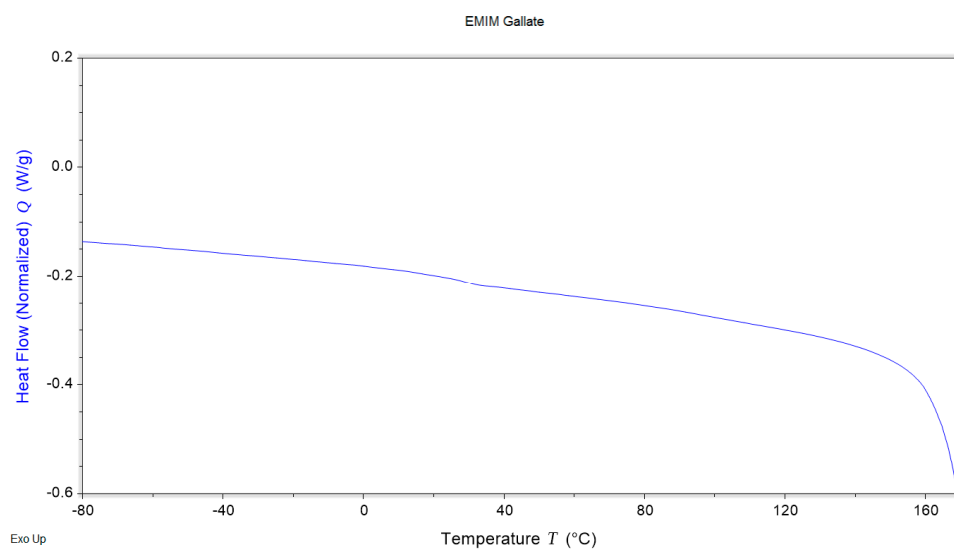
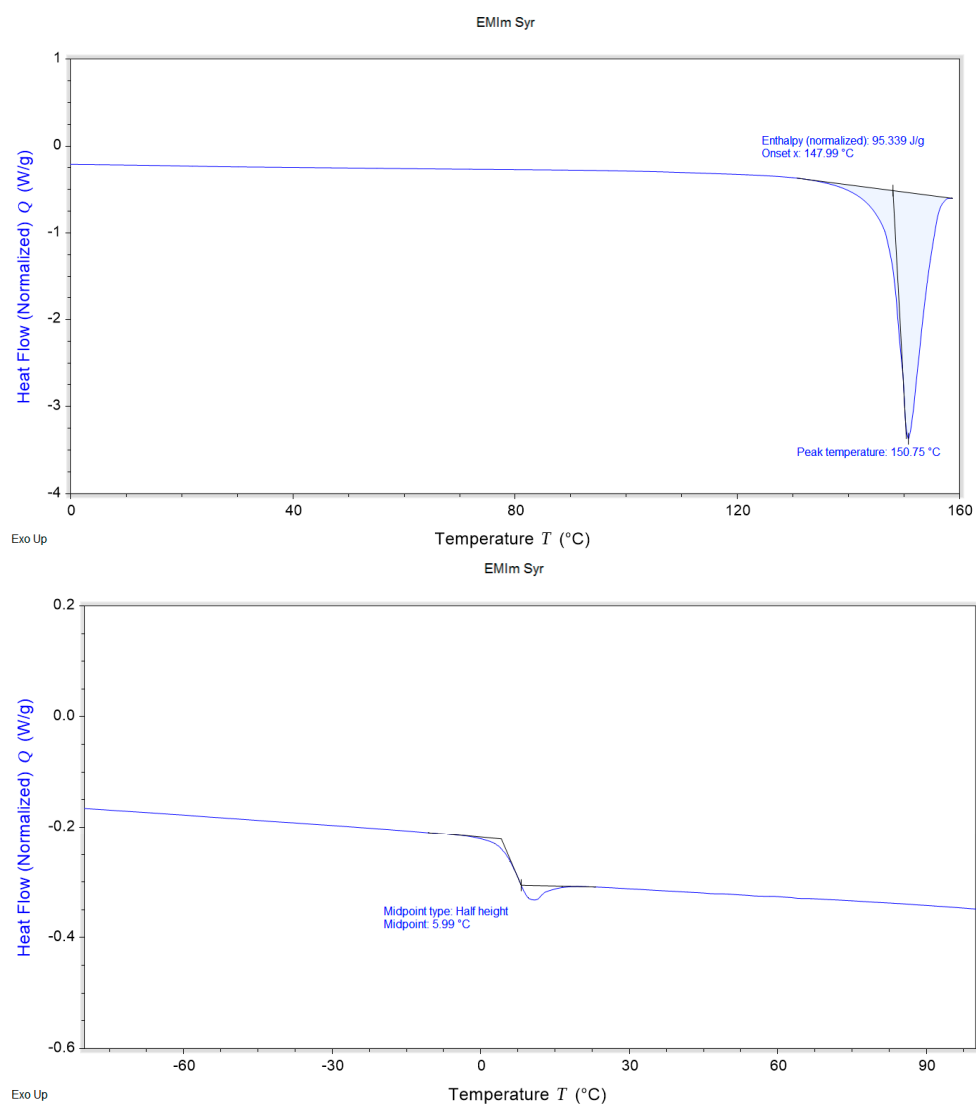
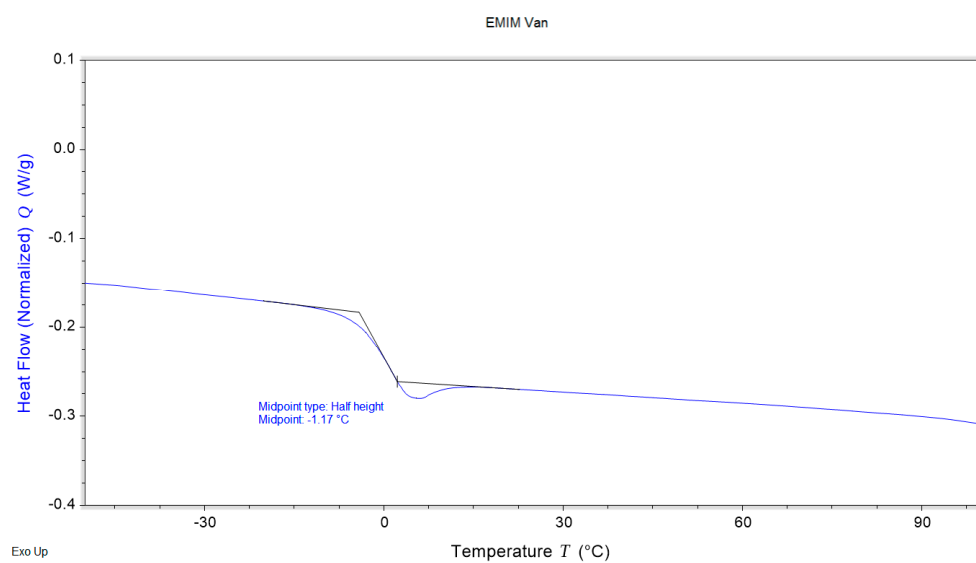
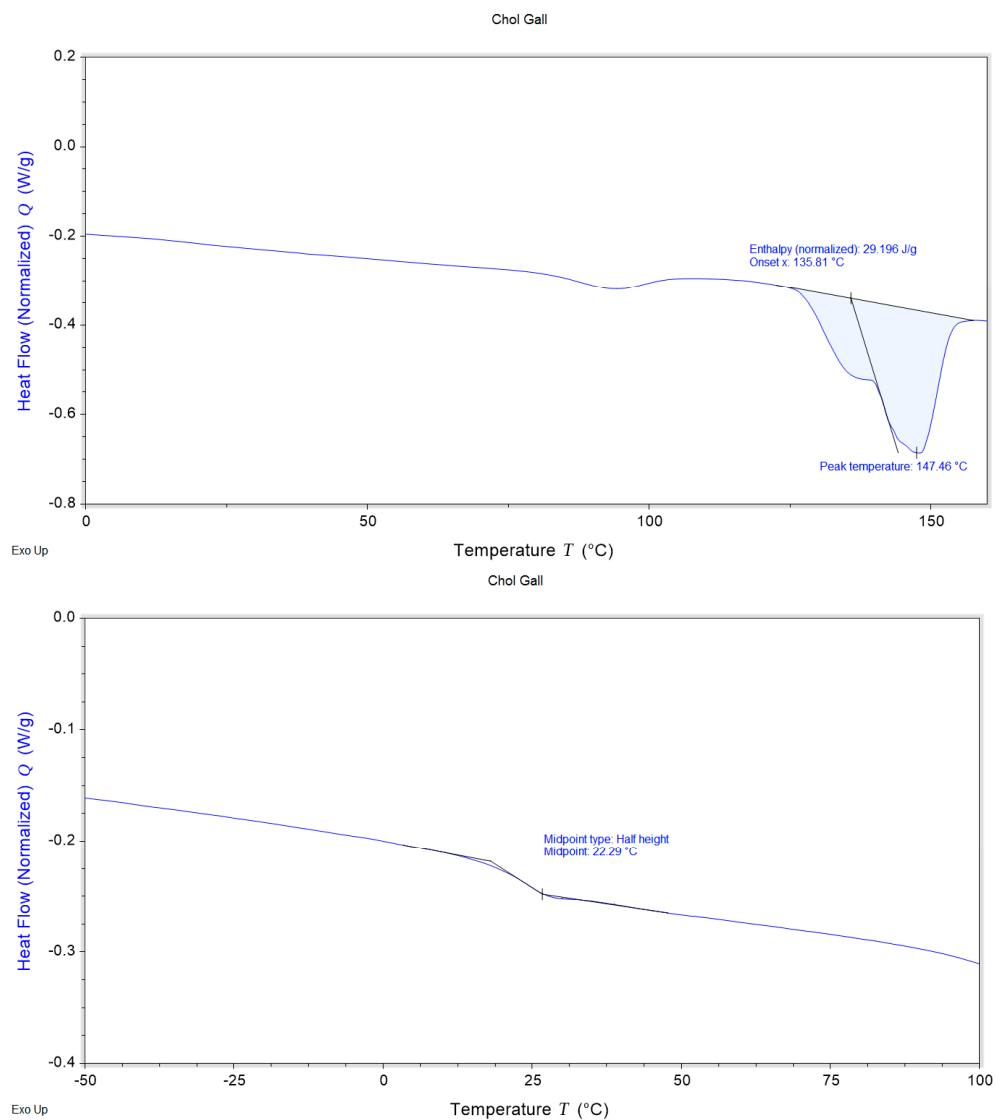
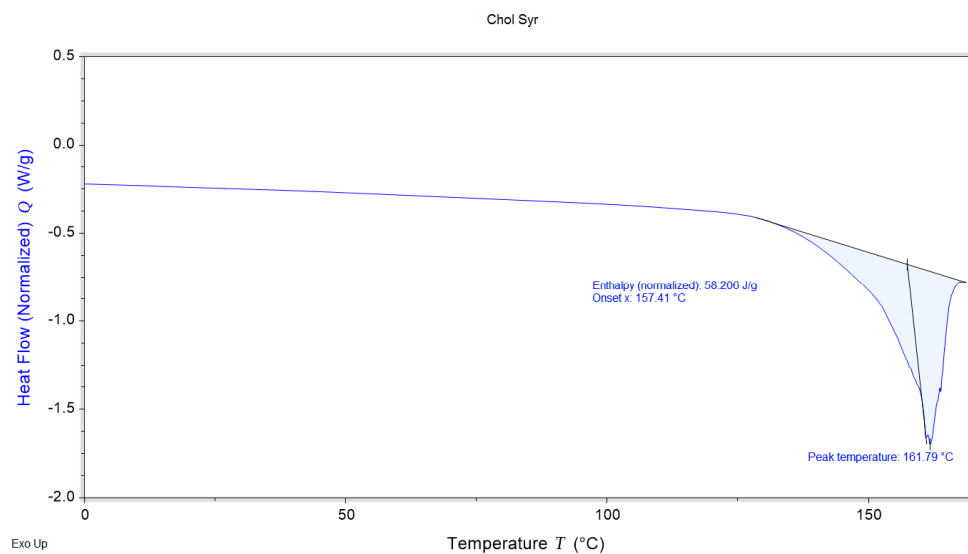
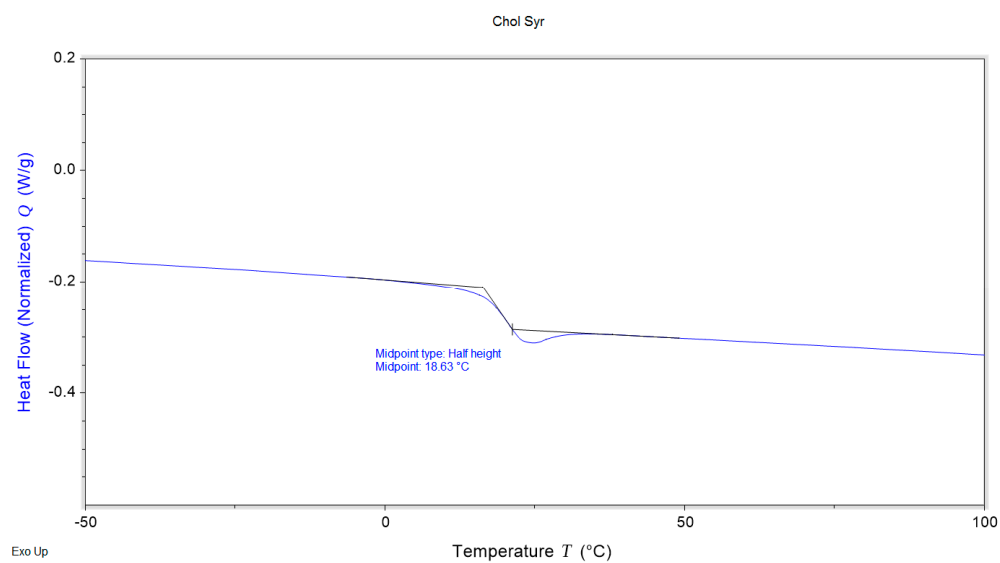
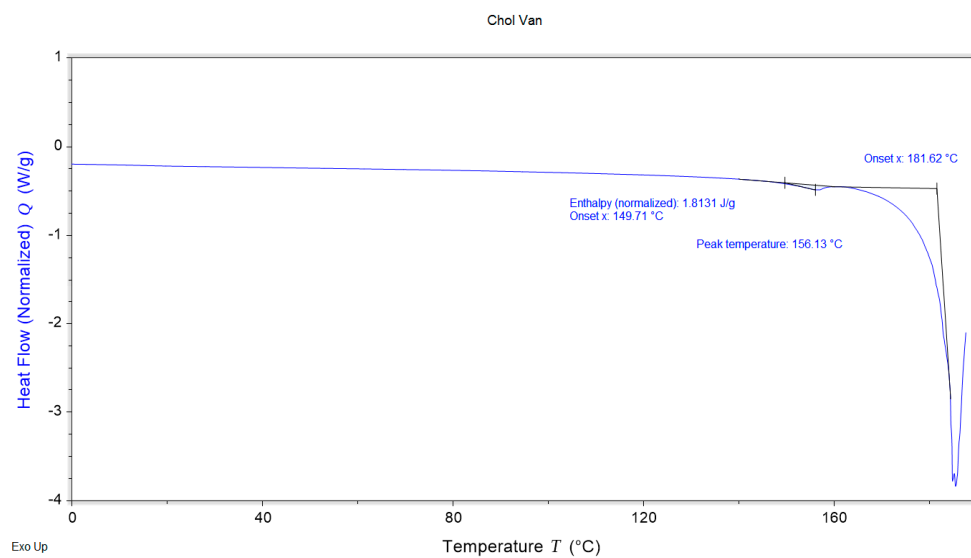
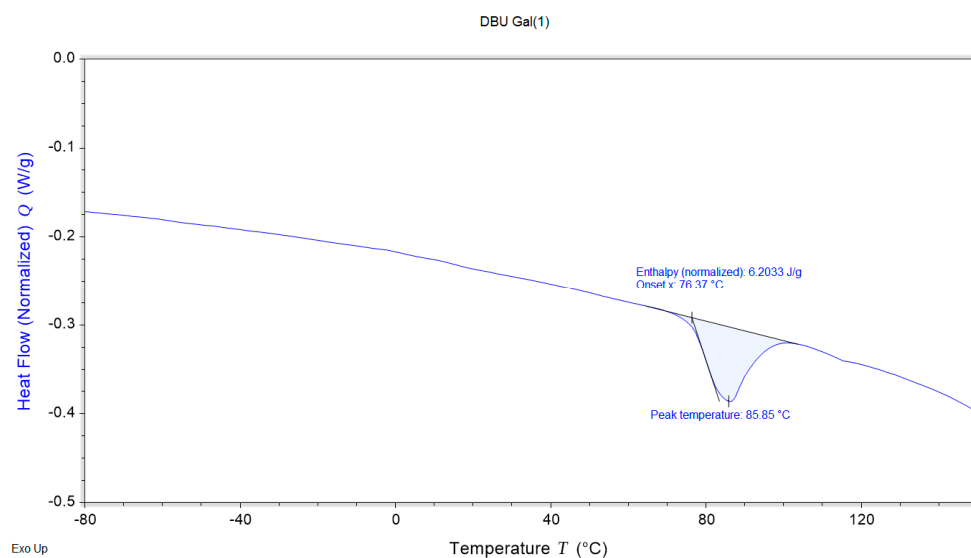
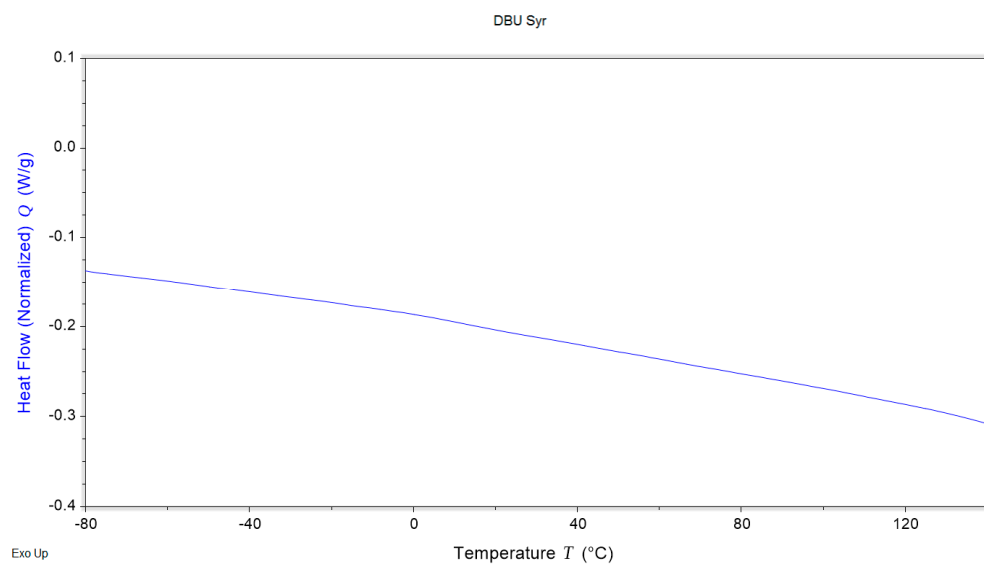
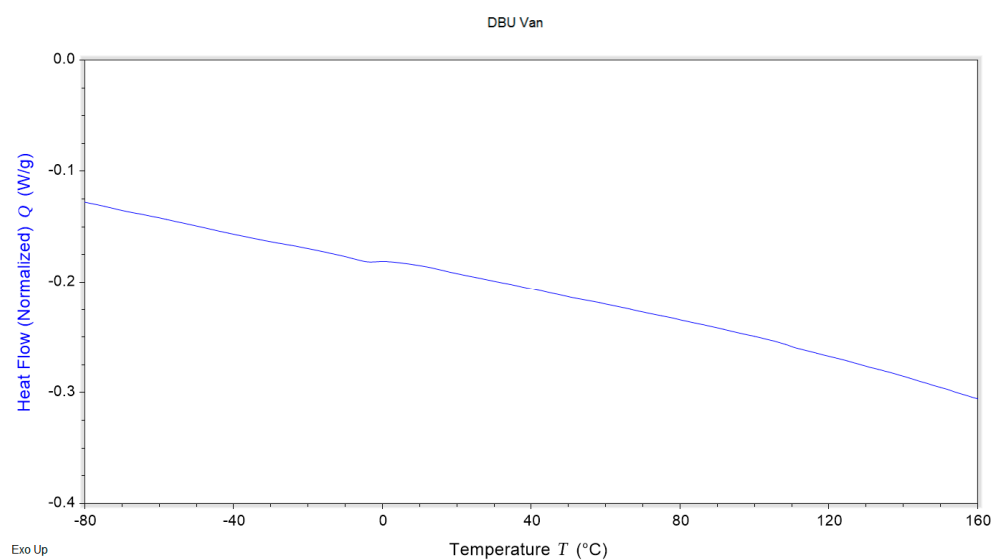


Figure S23 DSC curve of [Emim]Gal

**Figure S24** DSC curves of 1st and 2nd heating run of [Emim]Syr**Figure S25** DSC curve of [Emim]Van

**Figure S26** DSC curves of 1st and 2nd heating run of [Chol]Gal

**Figure S27** DSC curves of 1st and 2nd heating run of [Chol]Syr**Figure S28** DSC curve of [Chol]Van**Figure S29** DSC curves of [DBU]Gal

**Figure S30** DSC curves of [DBU]Syr**Figure S31** DSC curves of [DBU]Van