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Supporting information

A Non-phosgene Synthetic Process for Bioderived Polycarbonate with High-molecular-weight and Advanced Property Profile Catalyzed by Amino Acid Ionic Liquids

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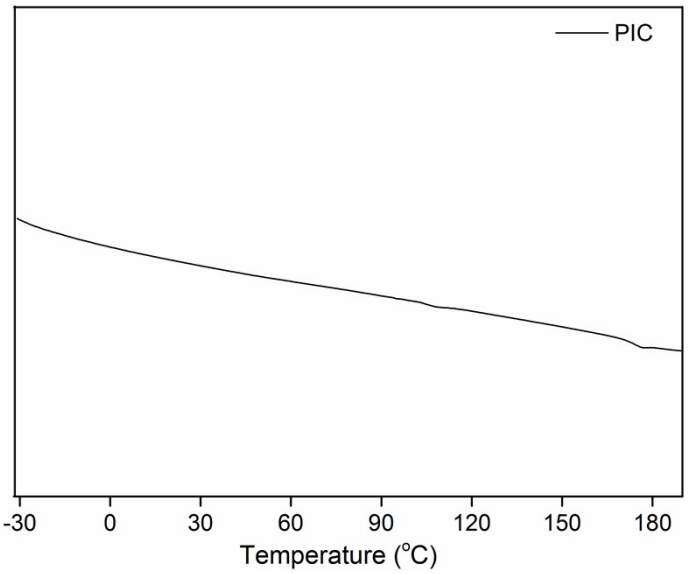

Fig. S1 DSC curve of the poly(isosorbide carbonate).

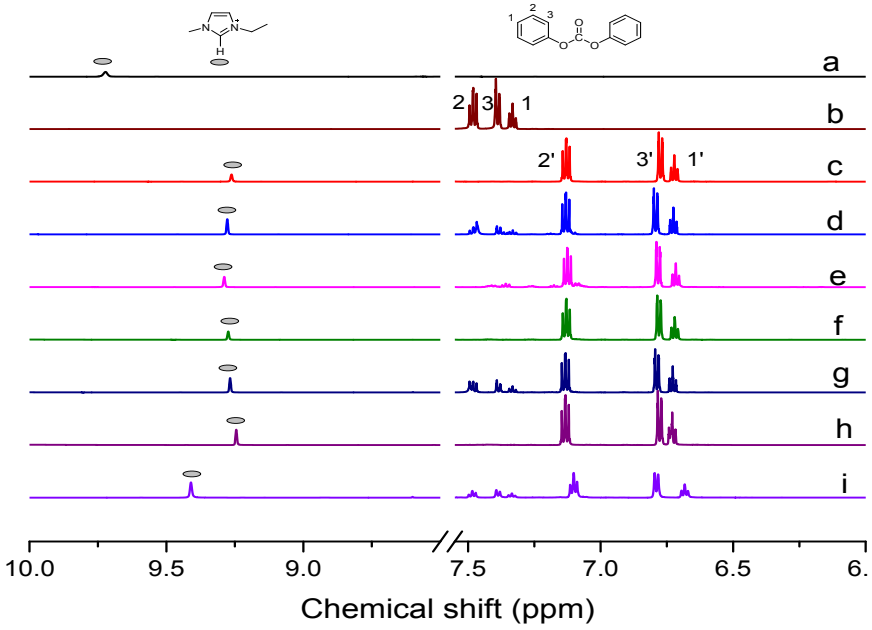

Fig. S2 ^{1}H NMR spectra of a) [Emim][Lys]; b) DPC; and DPC mixed with c) [Emim][Lys]; d) [Emim][Thr]; e) [Emim][Val]; f) [Emim][Ala]; g) [Emim][Ser]; h) [Emim][His]; i) [Emim][Asp].

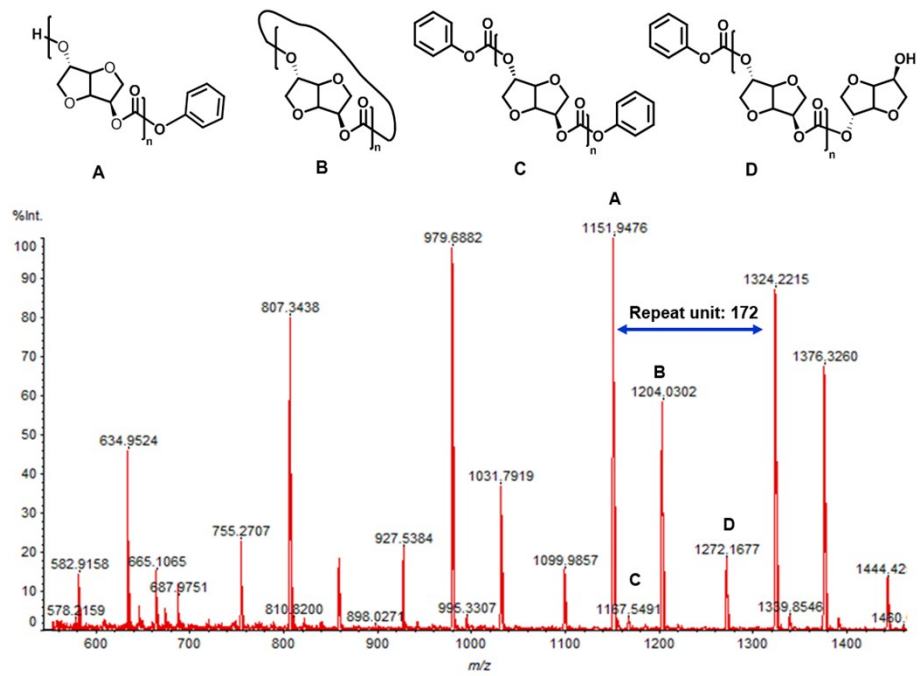

Fig. S3 MALDI-ToF-MS spectrum of PIC catalyzed by tetrabutylphosphonium acetate ionic liquid.

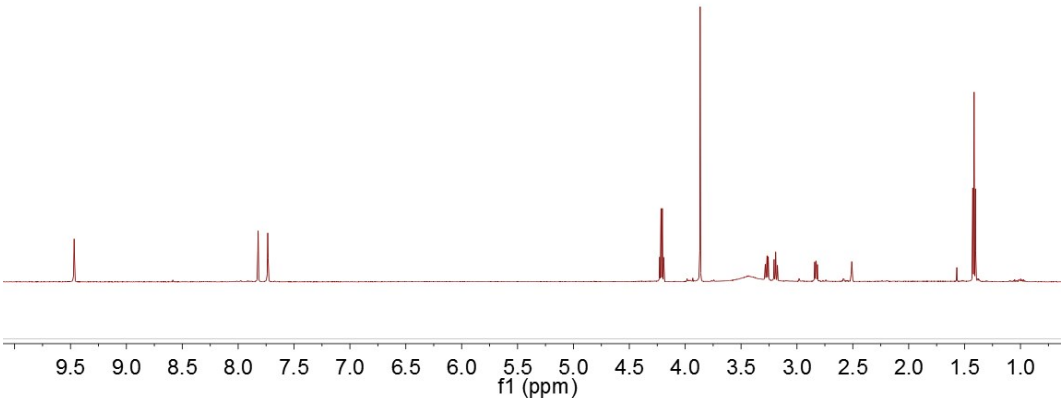

Fig. S4 ^{1}H NMR spectrum of [Emim][Ser] (DMSO, 600 MHz).

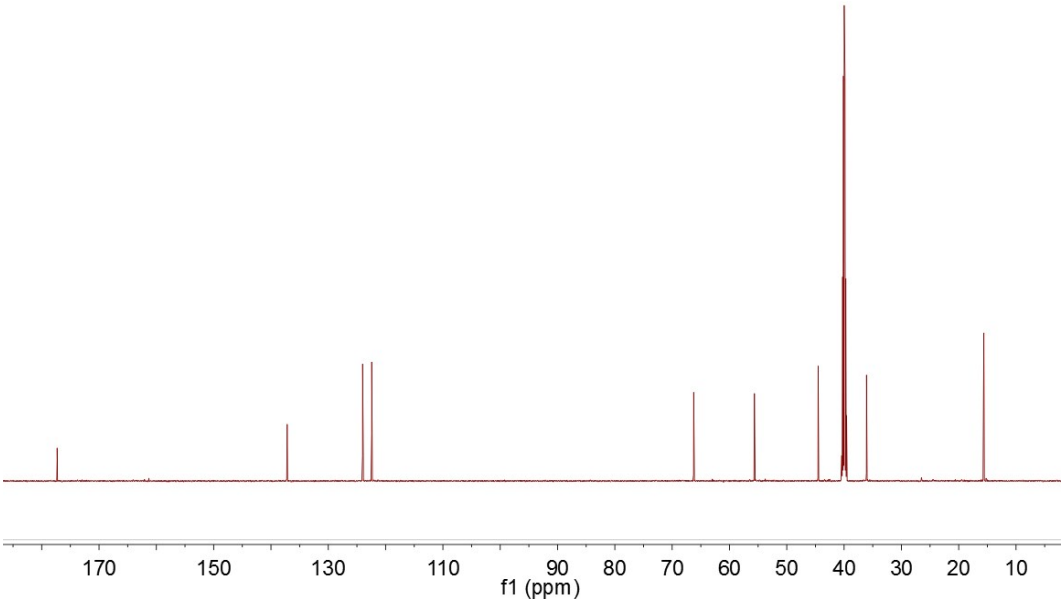

Fig. S5 ^{13}C NMR spectrum of [Emim][Ser] (DMSO, 150 MHz).

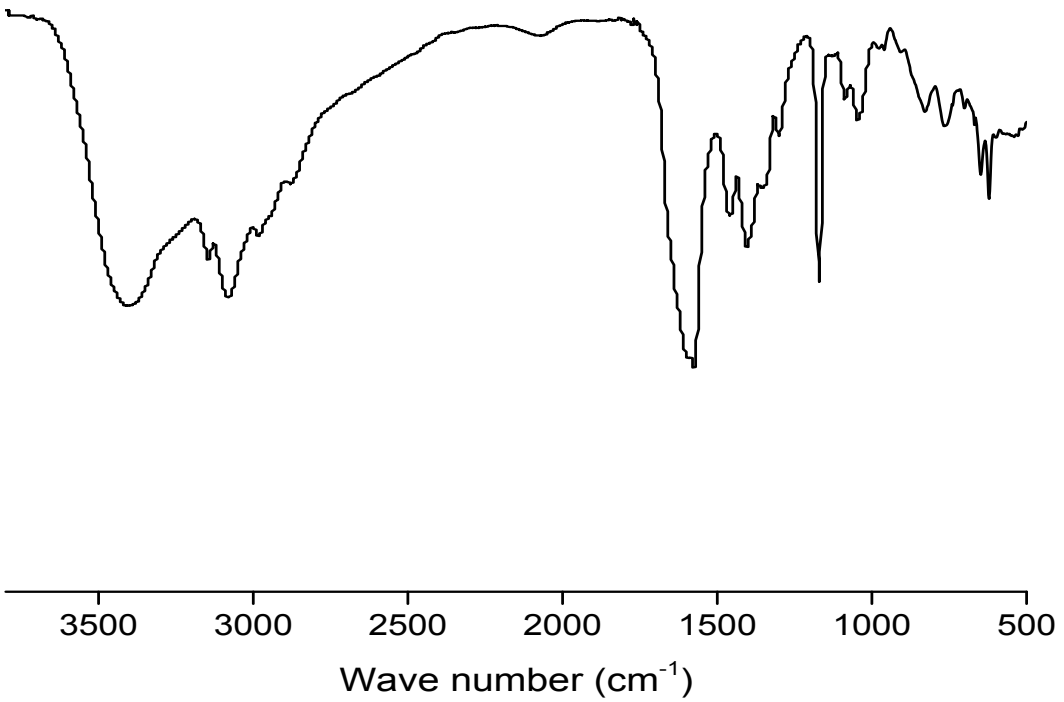

Fig. S6 FT-IR spectrum of [Emim][Ser] (KBr).

[Emim][Ser] : ^{1}H NMR (600 MHz, DMSO) δ 9.47 (s, 1H), 7.82 (s, 1H), 7.74 (s, 1H), 4.21 (q, 2H), 3.87 (s, 3H), 3.26 (q, 2H), 2.84 (q, 1H), 1.41 (t, 3H). ^{13}C NMR (150 MHz, DMSO) δ 177.23, 137.28, 124.01, 122.42, 66.29, 55.65, 44.52, 36.19, 15.46. FT-IR (KBr,cm^{-1}) : 3405, 3145, 3079, 1575, 1459, 1403, 1171, 829, 767, 648, 621.

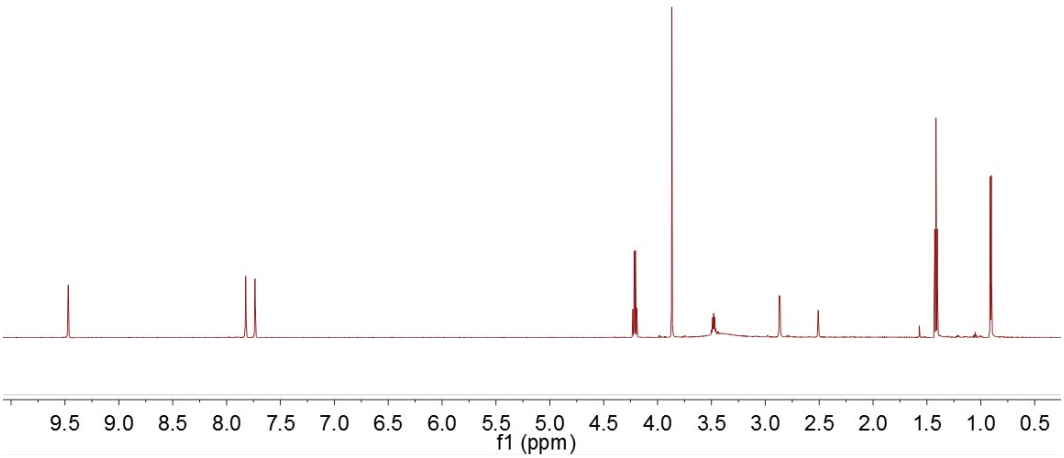

Fig. S7 ^{1}H NMR spectrum of [Emim][Thr] (DMSO, 600 MHz).

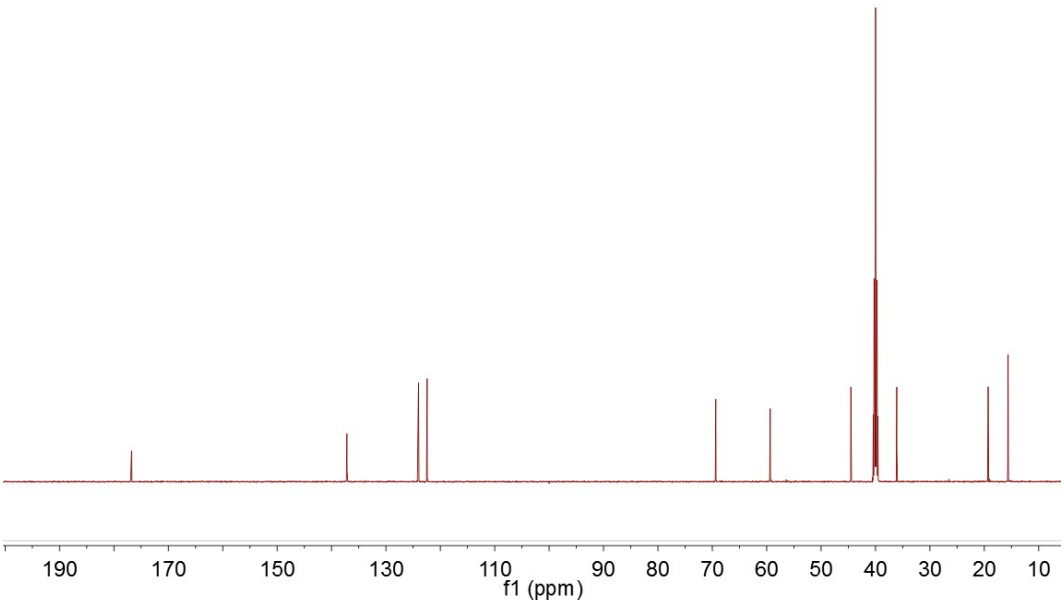

Fig. S8 ^{13}C NMR spectrum of [Emim][Thr] (DMSO, 150 MHz).

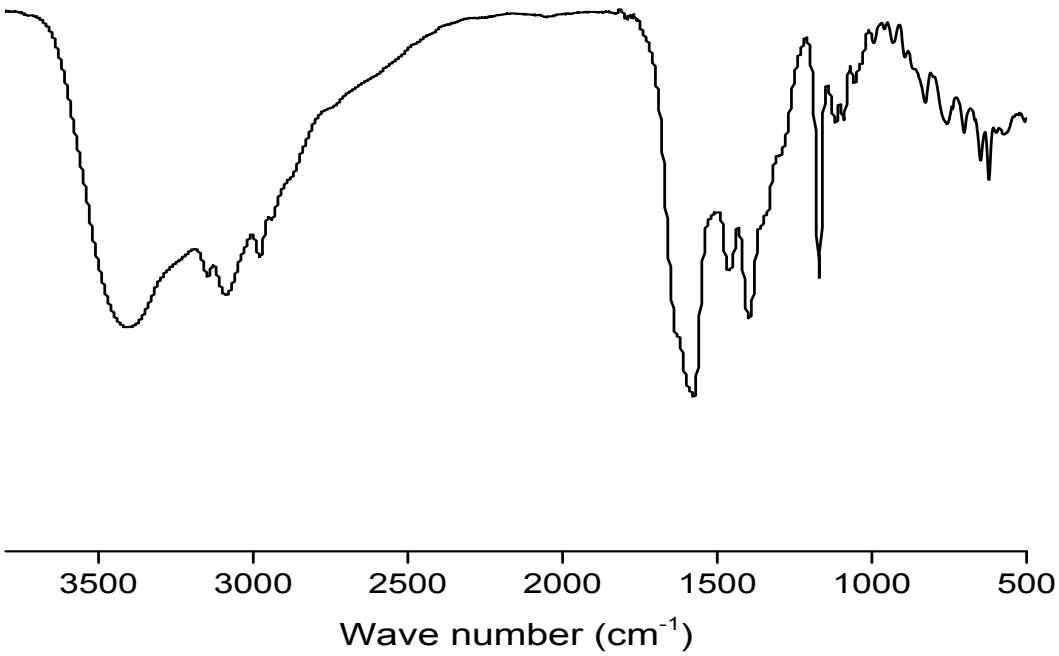

Fig. S9 FT-IR spectrum of [Emim][Thr] (KBr).

[Emim][Thr] : ^{1}H NMR (600 MHz, DMSO) δ 9.47 (s, 1H), 7.83 (s, 1H), 7.74 (s, 1H), 4.21 (q, 2H), 3.87 (s, 3H), 3.48 (m, 1H), 2.87 (d, 1H), 1.42 (t, 3H), 0.91 (d, 3H). ^{13}C NMR (150 MHz, DMSO) δ 176.76 (s), 137.17 (s), 124.01 (s), 69.28 (s), 59.25 (s), 36.09(s), 19.15 (s), 15.62 (s). FT-IR (KBr, cm^{-1}) : 3415, 3092, 1577, 1465, 1401, 1171, 829, 758, 621.

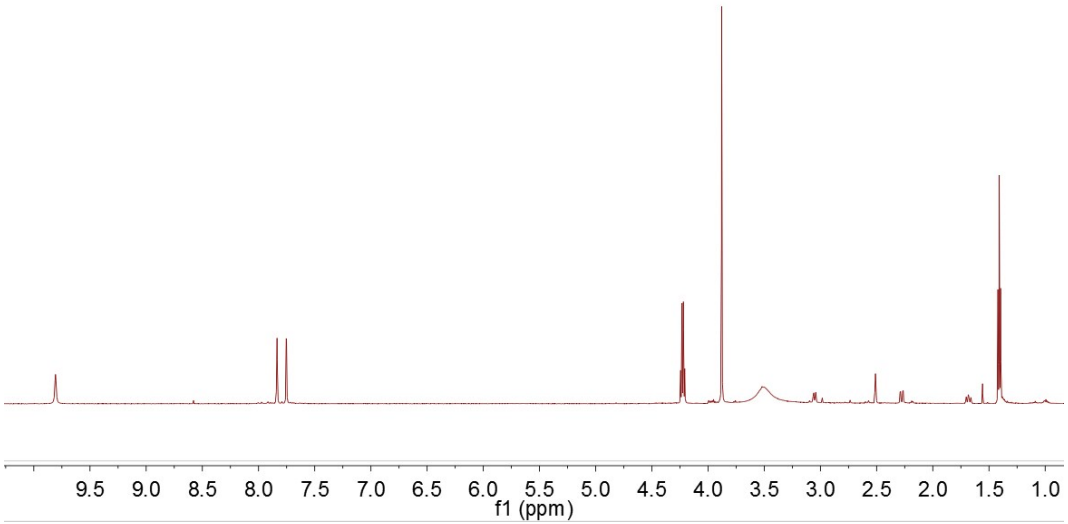

Fig. S10 ^{1}H NMR spectrum of [Emim][Asp] (DMSO, 600 MHz).

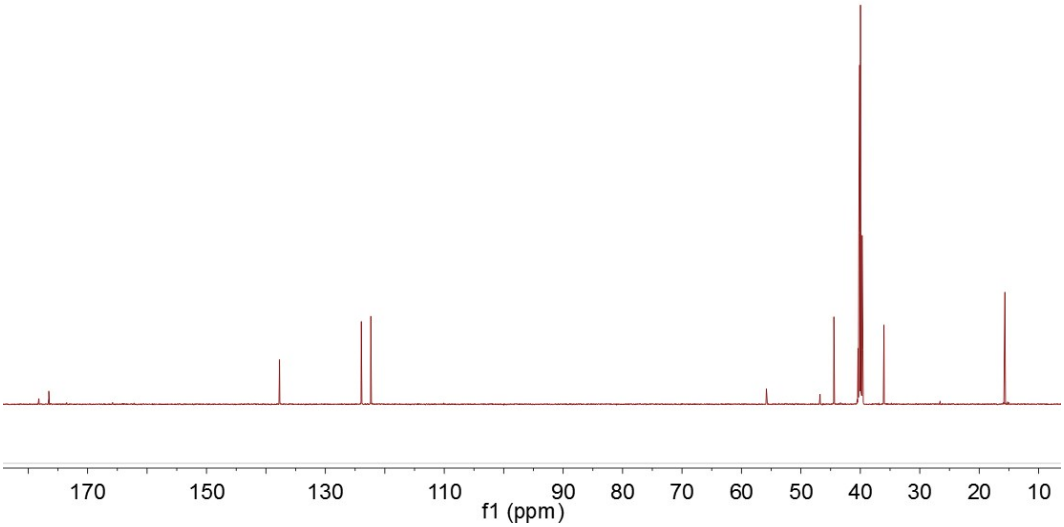

Fig. S11 ^{13}C NMR spectrum of [Emim][Asp] (DMSO, 150 MHz).

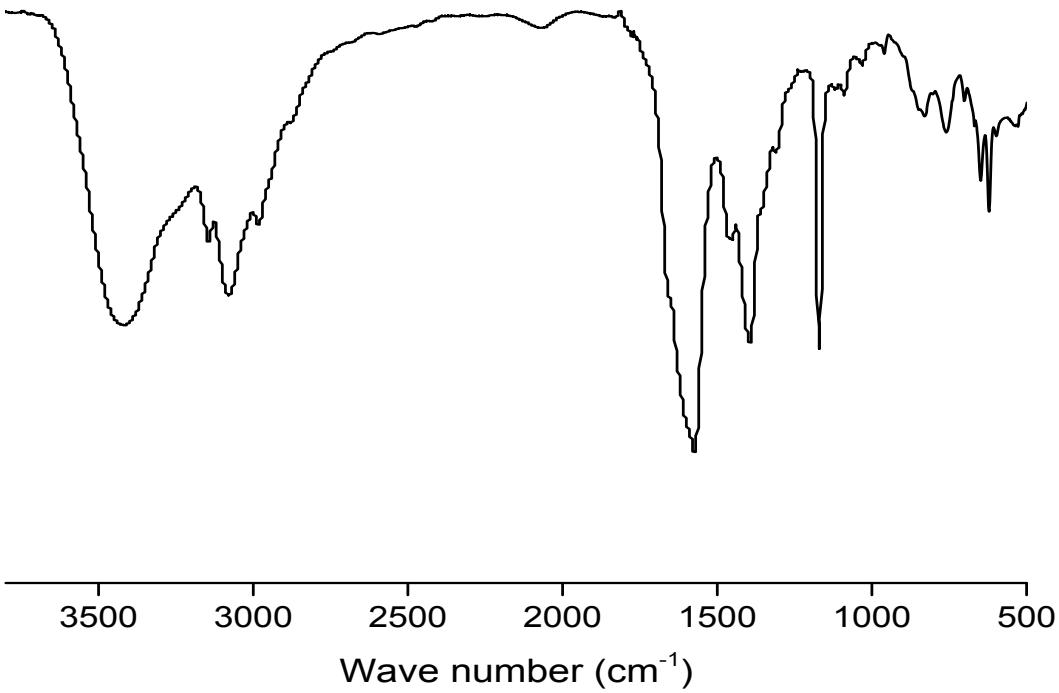

Fig. S12 FT-IR spectrum of [Emim][Asp] (KBr).

[Emim][Asp] : ^{1}H NMR (600 MHz, DMSO) δ 9.81 (s, 1H), 7.84 (s, 1H), 7.75 (s, 1H), 4.23 (q, 2H), 3.88 (s, 3H), 3.06 (m, 1H), 2.51 (m, 1H), 2.26 (d, 1H), 1.41 (t, 3H). ^{13}C NMR (150 MHz, DMSO) δ 176.52 (s), 137.80 (s), 123.96 (s), 122.20 (s), 55.69 (s), 44.45 (s), 36.08 (s), 15.76 (s). FT-IR (KBr, cm^{-1}) : 3416, 3144, 3079, 1574, 1294, 1171, 830, 759, 648, 621.

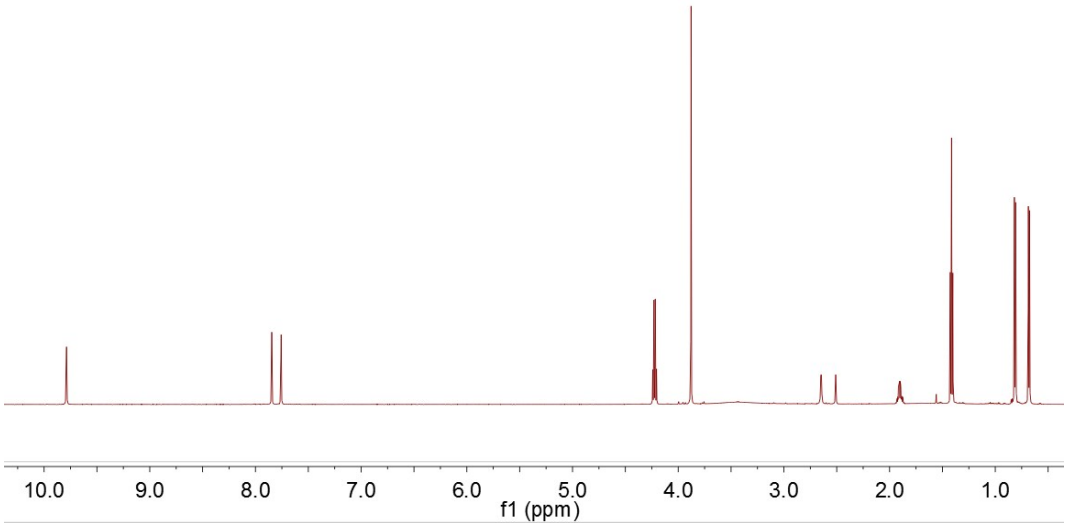

Fig. S13 ^{1}H NMR spectrum of [Emim][Val] (DMSO, 600 MHz).

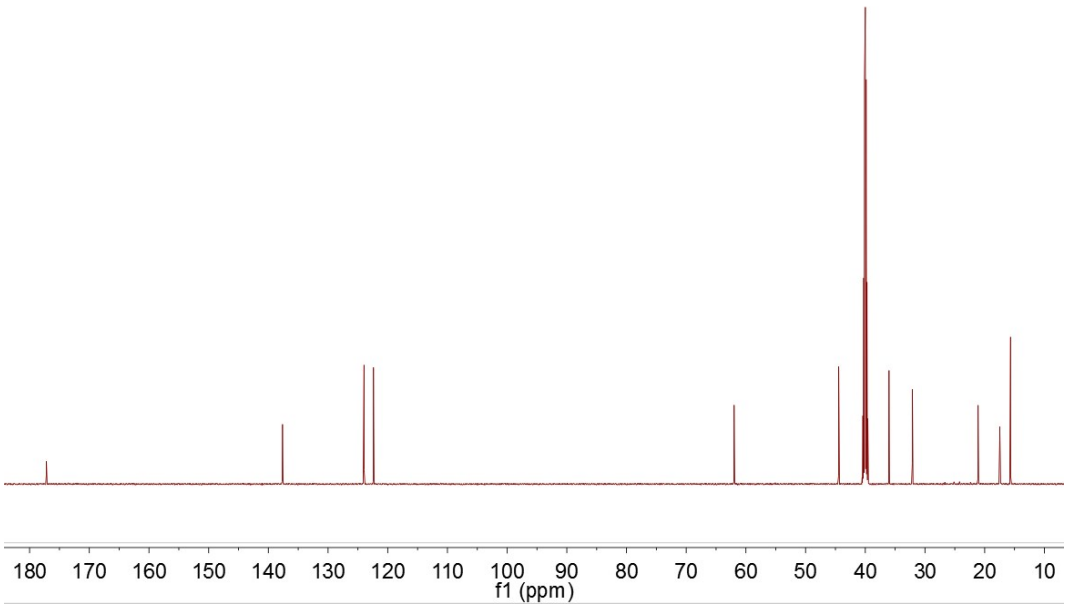

Fig. S14 ^{13}C NMR spectrum of [Emim][Val] (DMSO, 150 MHz).

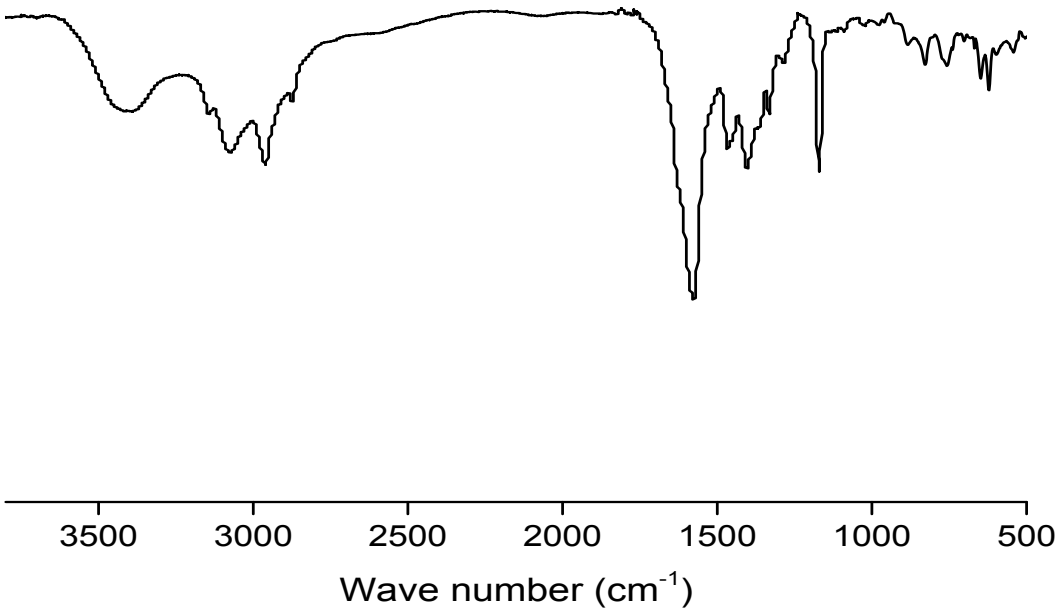

Fig. S15 FT-IR spectrum of [Emim][Val] (KBr).

[Emim][Val] : ^{1}H NMR (600 MHz, DMSO) δ 9.79 (s, 1H), 7.85 (s, 1H), 7.76 (s, 1H), 4.22 (q, 2H), 3.88 (s, 3H), 1.89 (m, 1H), 1.41 (t, 3H), 0.81 (d, 3H), 0.68 (d, 3H). ^{13}C NMR (150 MHz, DMSO) δ 177.19 (s), 137.63 (s), 123.89 (s), 122.49 (s), 61.97 (s), 44.46 (s), 35.93 (s), 32.11 (s), 21.10 (s), 17.47 (s), 15.66 (s). FT-IR (KBr, cm^{-1}) : 3392, 3075, 2961, 1576, 1467, 1404, 1171, 827, 758, 648, 622.

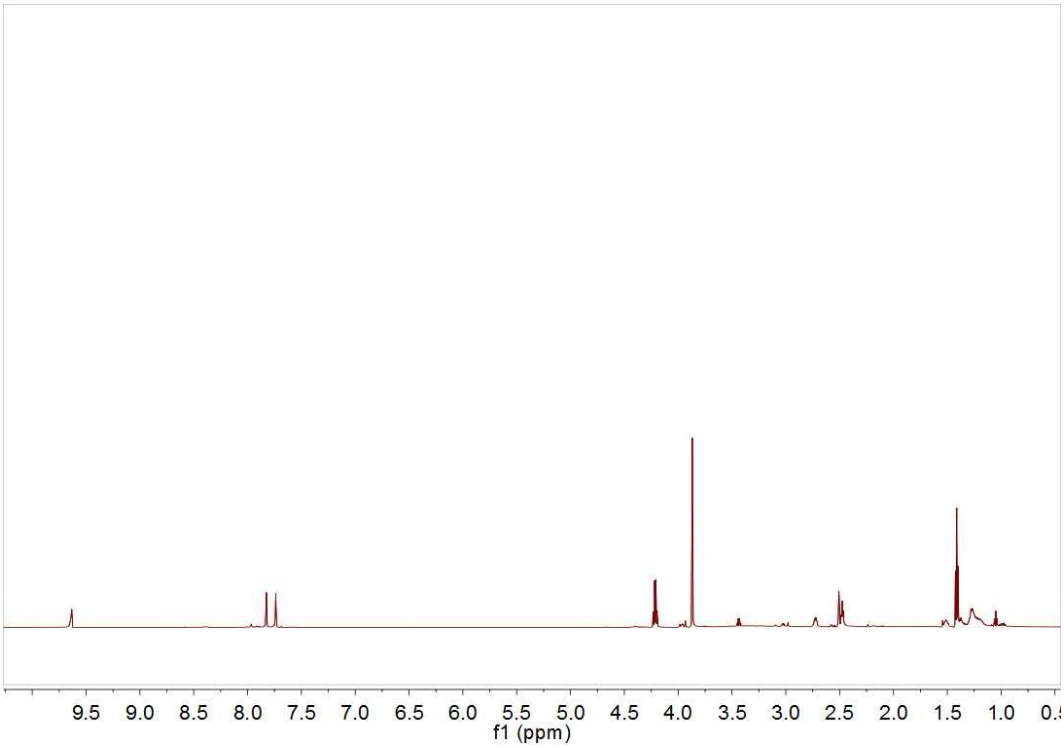

Fig. S16 ^{1}H NMR spectrum of [Emim][Lys] (DMSO, 600 MHz).

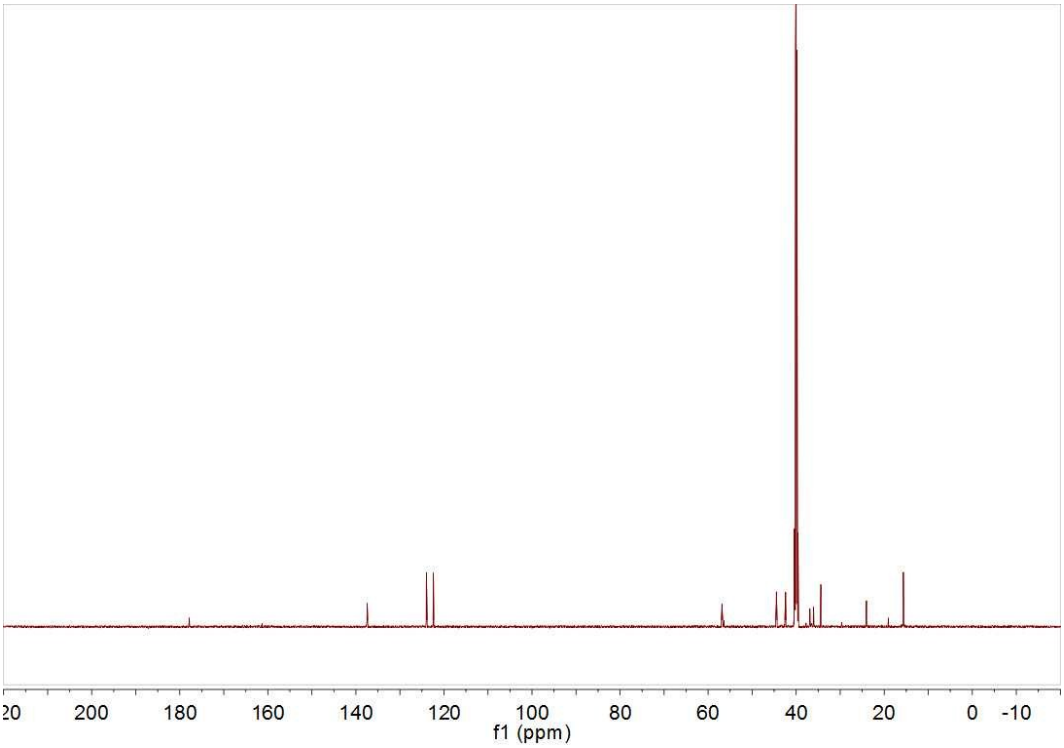

Fig. S17 ^{13}C NMR spectrum of [Emim][Lys] (DMSO, 150 MHz).

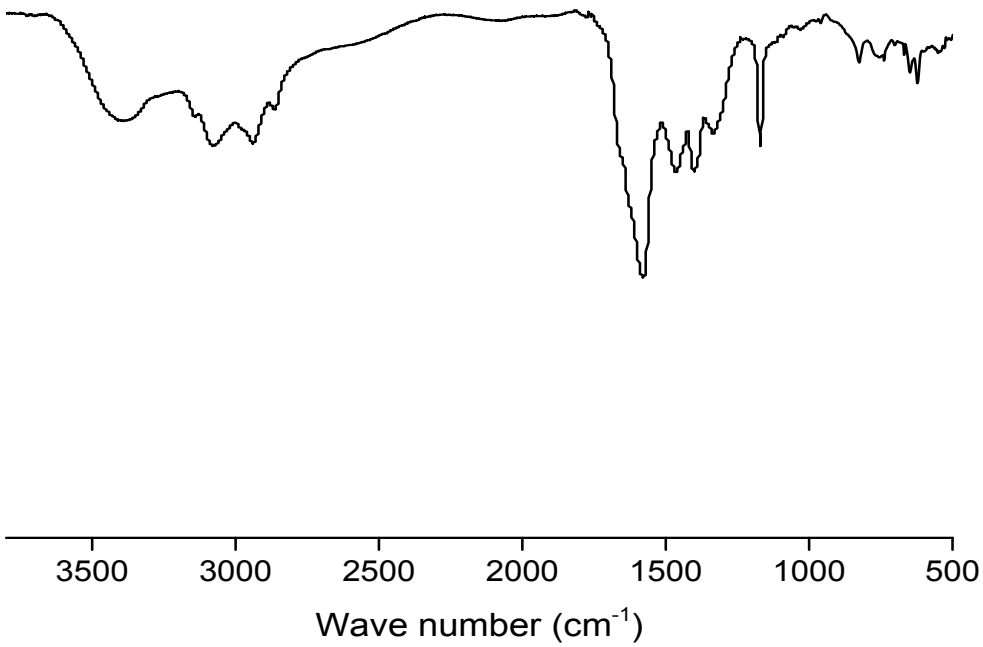

Fig. S18 FT-IR spectrum of [Emim][Lys] (KBr).

[Emim][Lys] : ^{1}H NMR (600 MHz, DMSO) δ 9.63 (s, 1H), 7.83 (s, 1H), 7.74 (s, 1H), 4.21 (q, 2H), 3.87 (s, 3H), 2.73 (m, 1H), 2.48 (t, 2H), 1.52 (m, 1H), 1.41 (t, 3H), 1.23 (m, 5H). ^{13}C NMR (150 MHz, DMSO) δ 177.92, 137.51, 123.99, 122.40, 56.86, 44.49, 42.45, 36.80, 35.90, 34.34, 24.04, 15.65. FT-IR (KBr, cm^{-1}) : 3392, 3079, 2939, 1577, 1462, 1402, 1171, 826, 738, 648, 621.

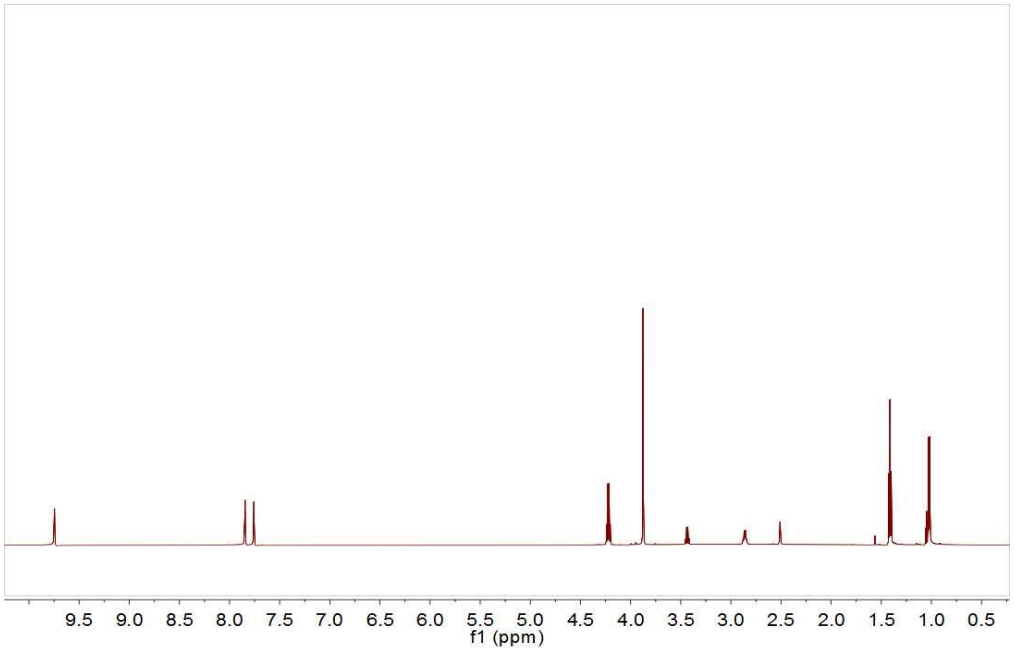

Fig. S19 ^{1}H NMR spectrum of [Emim][Ala] (DMSO, 600 MHz).

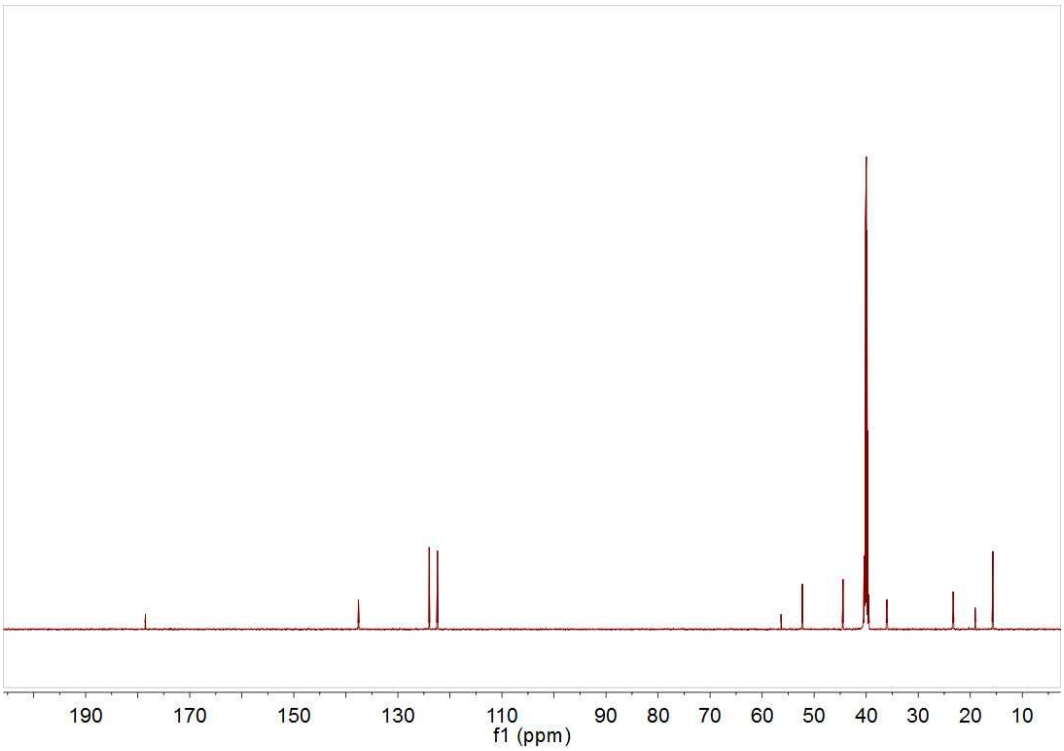

Fig. S20 ^{13}C NMR spectrum of [Emim][Ala] (DMSO, 150 MHz).

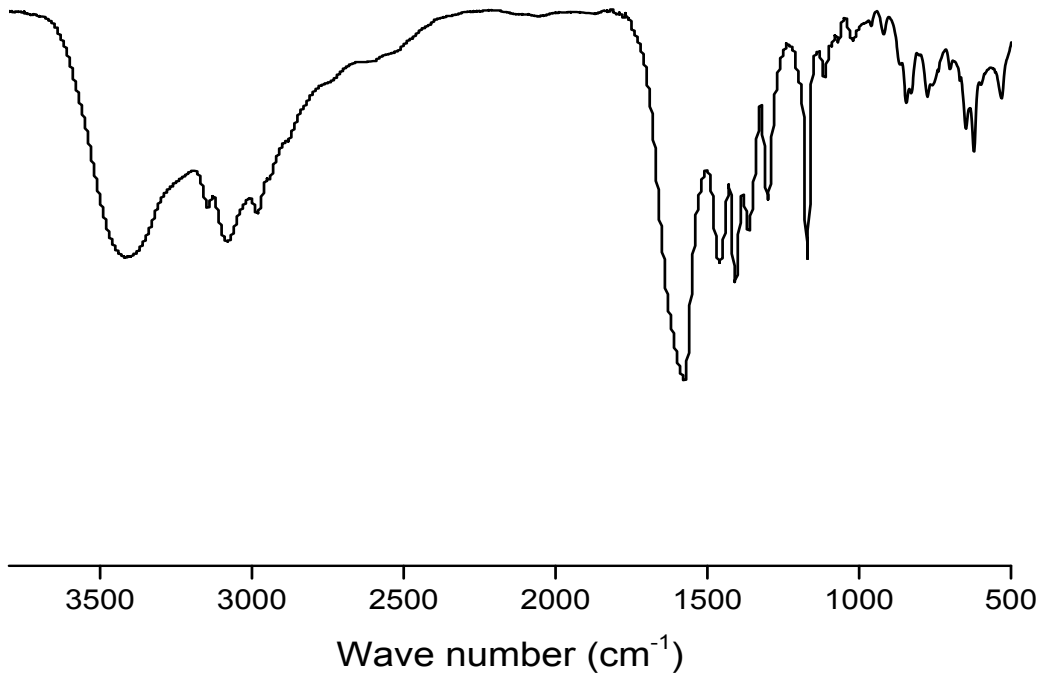

Fig. S21 FT-IR spectrum of [Emim][Ala] (KBr).

[Emim][Ala] : ^{1}H NMR (600 MHz, DMSO) δ 9.75 (s, 1H), 7.84 (s, 1H), 7.76 (s, 1H), 4.22 (q, 2H), 3.88 (s, 3H), 2.86 (q, 1H), 1.41 (t, 3H), 1.03 (t, 3H). ^{13}C NMR (150 MHz, DMSO) δ 178.60, 137.57, 123.98, 122.40, 56.28, 52.27, 44.36, 35.95, 23.28, 19.09, 15.66. FT-IR (KBr, cm^{-1}) : 3416, 3080, 2981, 1576, 1460, 1407, 1300, 1171, 844, 775, 648, 622.

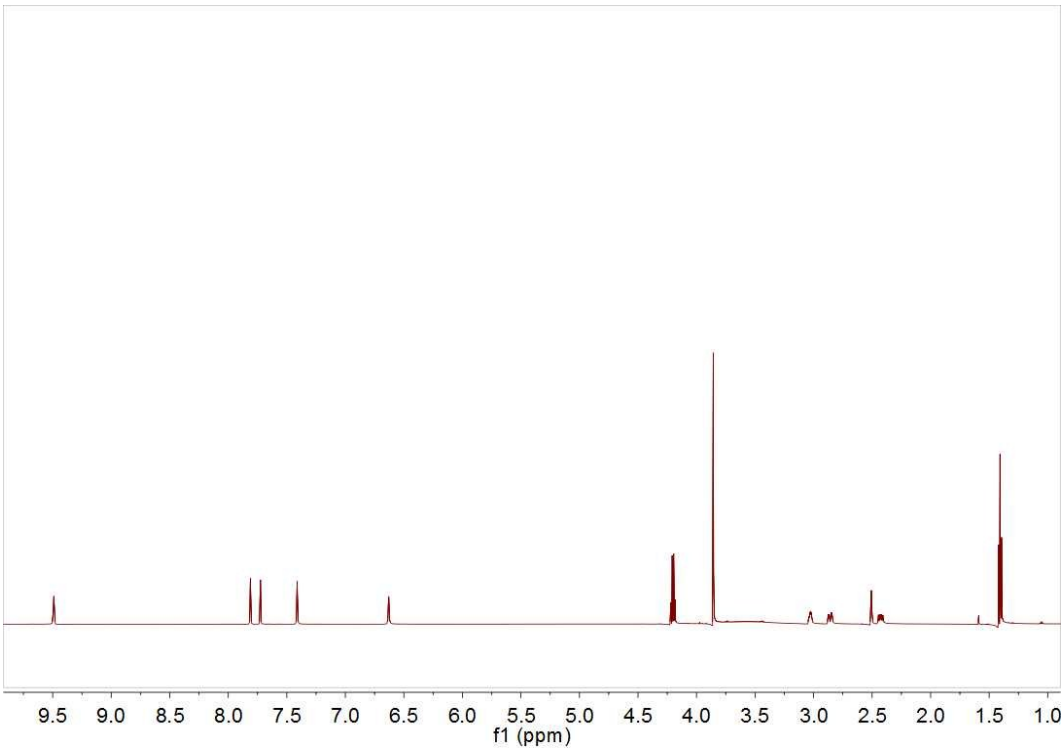

Fig. S22 ^{1}H NMR spectrum of [Emim][His] (DMSO, 600 MHz).

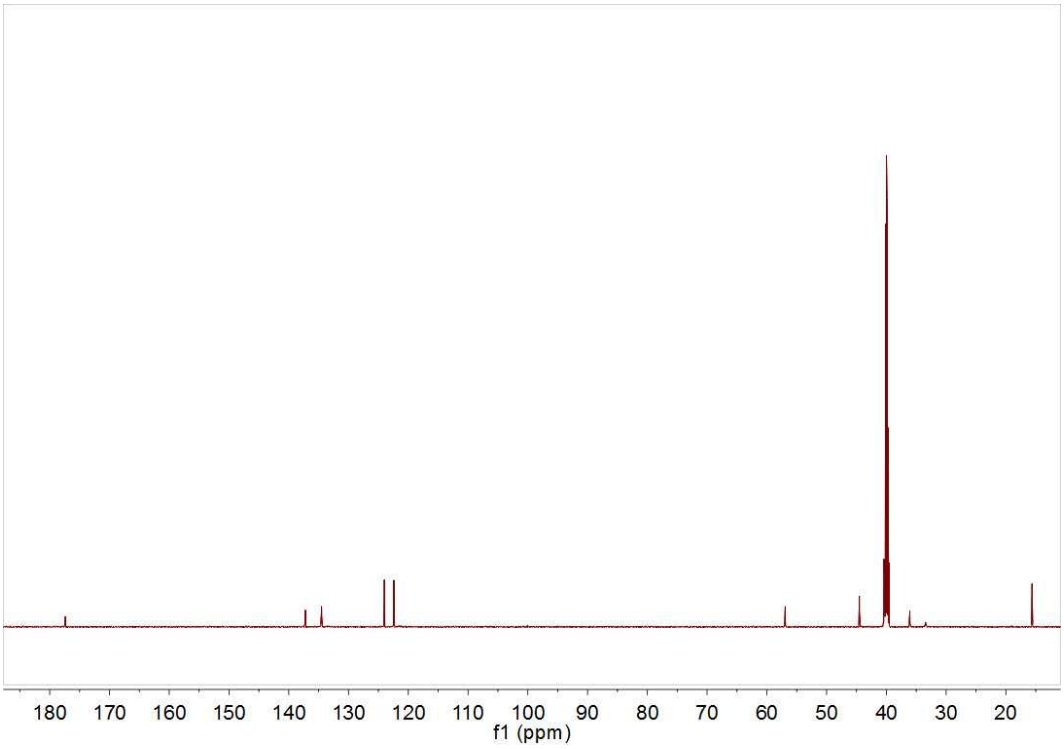

Fig. S23 ^{13}C NMR spectrum of [Emim][His] (DMSO, 150 MHz).

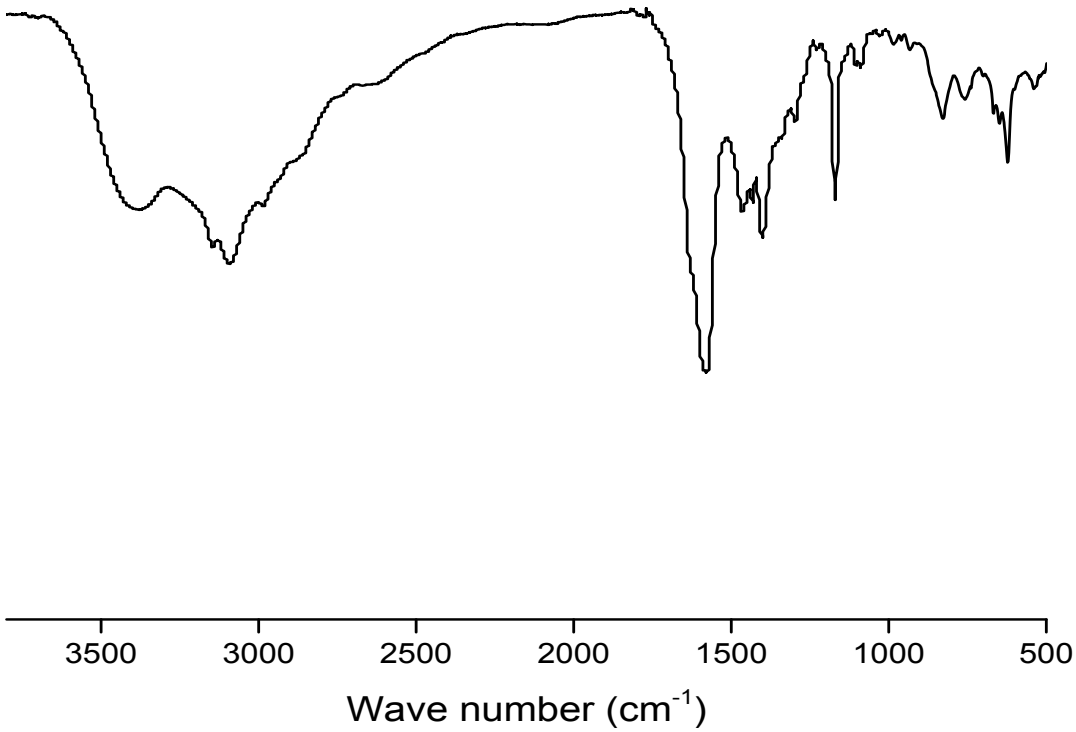

Fig. S24 FT-IR spectrum of [Emim][His] (KBr).

[Emim][His] : ^{1}H NMR (600 MHz, DMSO) δ 9.49 (s, 1H), 7.81 (s, 1H), 7.73 (s, 1H), 7.41 (s, 1H), 6.63 (s, 1H), 4.20 (q, 2H), 3.86 (s, 3H), 3.02 (q, 1H), 2.85 (q, 1H), 2.42 (q, 1H), 1.41 (t, 3H). ^{13}C NMR (150 MHz, DMSO) δ 177.37, 137.22, 134.60, 124.00, 122.25, 56.93, 44.41, 36.17, 15.62. FT-IR (KBr, cm^{-1}) : 3378, 3093, 1577, 1465, 1401, 1171, 828, 757, 622