Electronic Supplementary Material (ESI) for RSC Advances

Supporting Information For

X-Ray Photoelectron Spectroscopy of Metal Ionic Liquids

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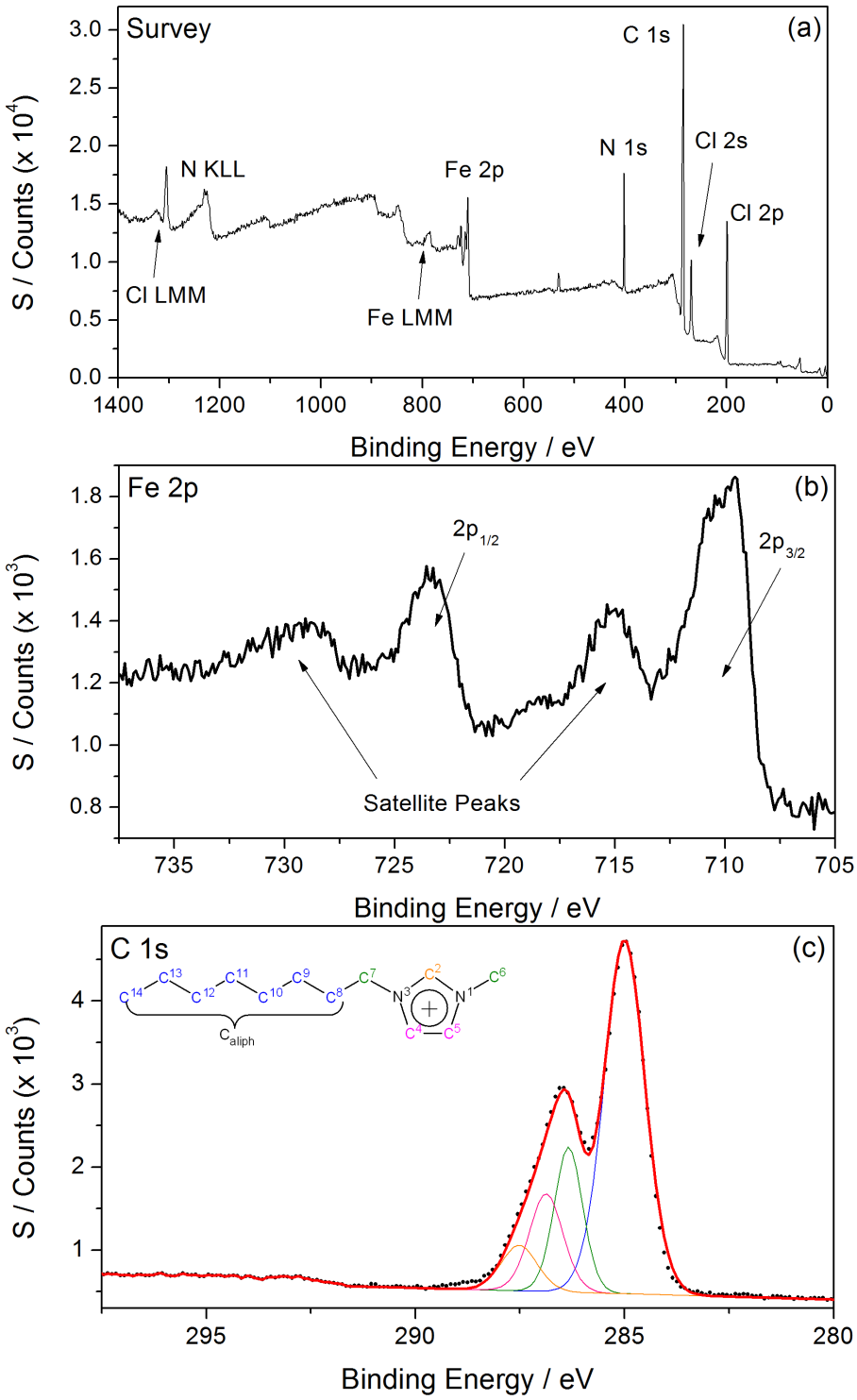


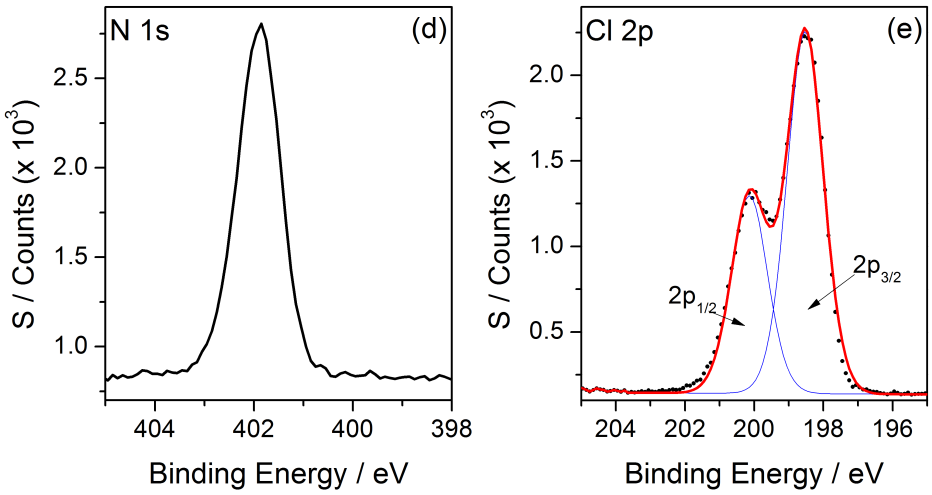
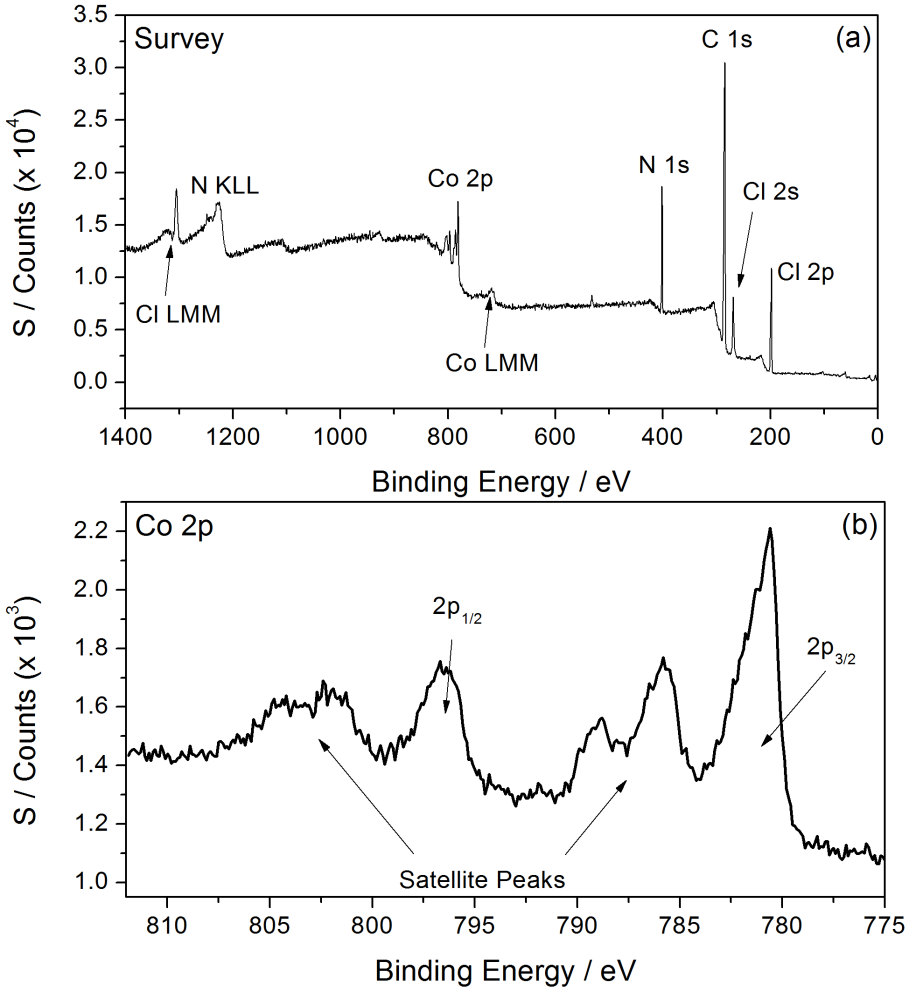


Figure S1 *(a) Survey scan and high resolution XP spectra of the (b) Fe 2p, (c) C 1s, (d) N 1s and (e) Cl 2p regions of* $[C_8C_1Im]Cl\text{-}Fe^{II}Cl_2$ *(*χ_{FeCl2} *= 0.33). The components used to fit the C 1s XP spectrum are shown in (c), allowing the simulated envelope to be compared with the experimental spectrum (black dots). Absolute binding energies are given in Table 1; all spectra were charge corrected to* C_{aliph} *1s = 285.0 eV.*



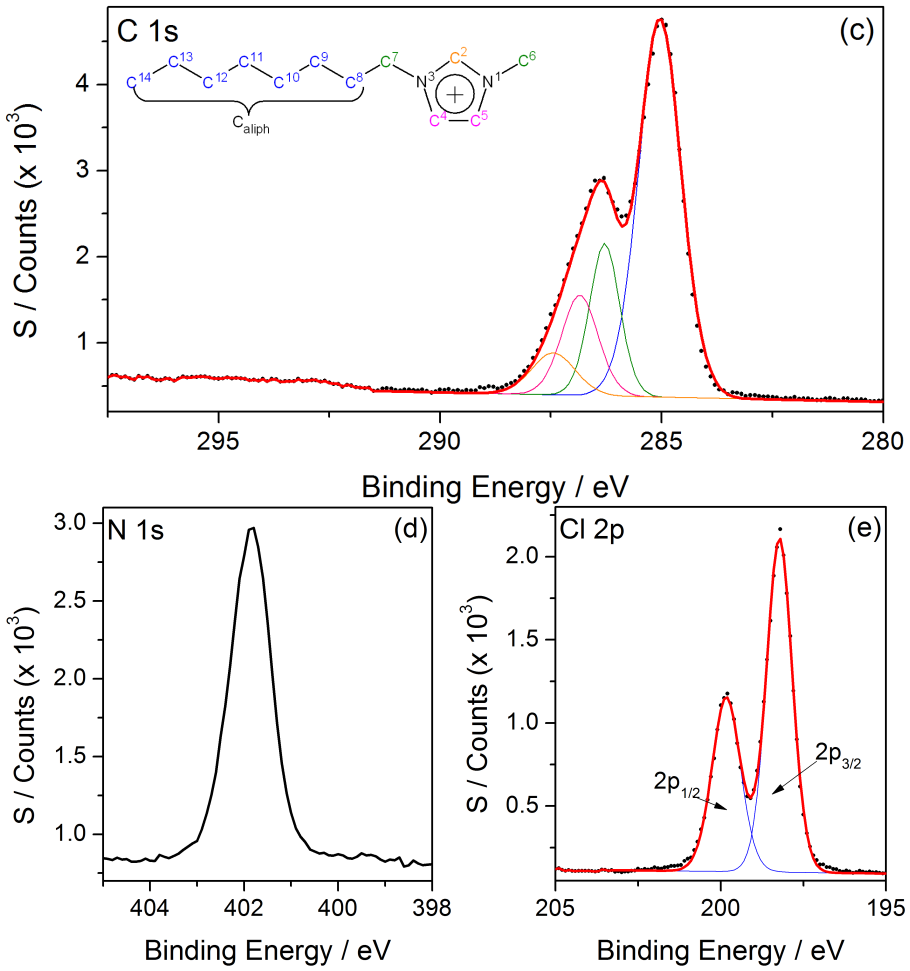
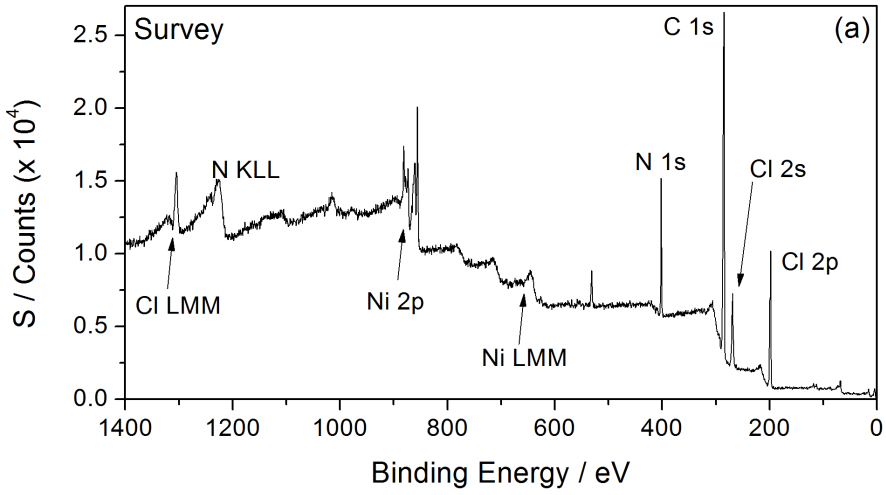


Figure S2 *(a) Survey scan and high resolution XP spectra of the (b) Co 2p, (c) C 1s, (d) N 1s and (e) Cl 2p regions of* $[C_8C_1Im]Cl\text{-}Co^{II}Cl_2$ *(*χ_{CoCl2} *= 0.33). The components used to fit the C 1s XP spectrum are shown in (c), allowing the simulated envelope to be compared with the experimental spectrum (black dots). Absolute binding energies are given in Table 1; all spectra were charge corrected to* C_{aliph} *1s = 285.0 eV.*



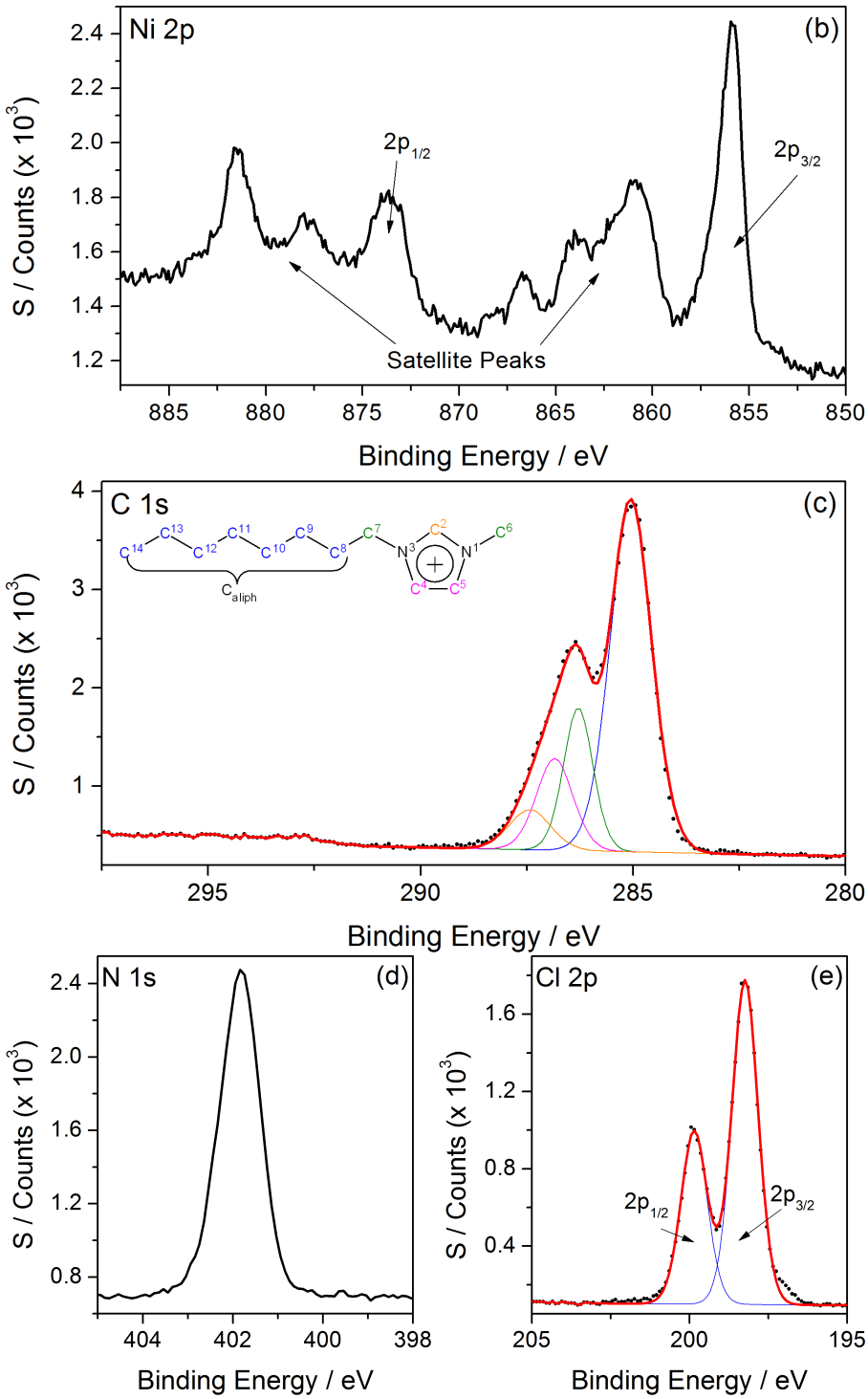
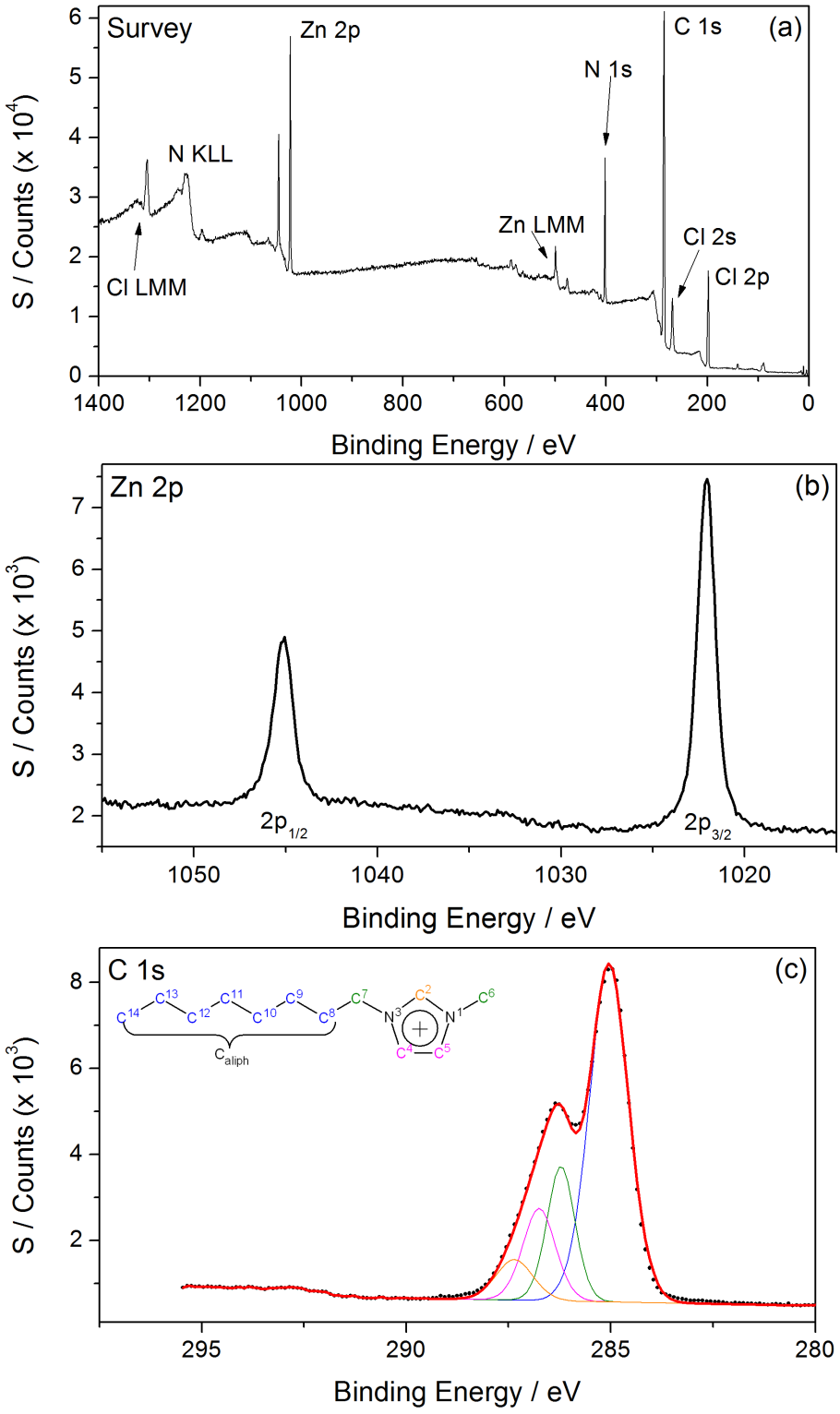


Figure S3 *(a) Survey scan and high resolution XP spectra of the (b) Ni 2p, (c) C 1s, (d) N 1s and (e) Cl 2p regions of [C_8C_1Im]Cl-$Co^{II}Cl_2$ (χ_{NiCl2} = 0.33). The components used to fit the C 1s XP spectrum are shown in (c), allowing the simulated envelope to be compared with the experimental spectrum (black dots). Absolute binding energies are given in Table 1; all spectra were charge corrected to C_{aliph} 1s = 285.0 eV.*



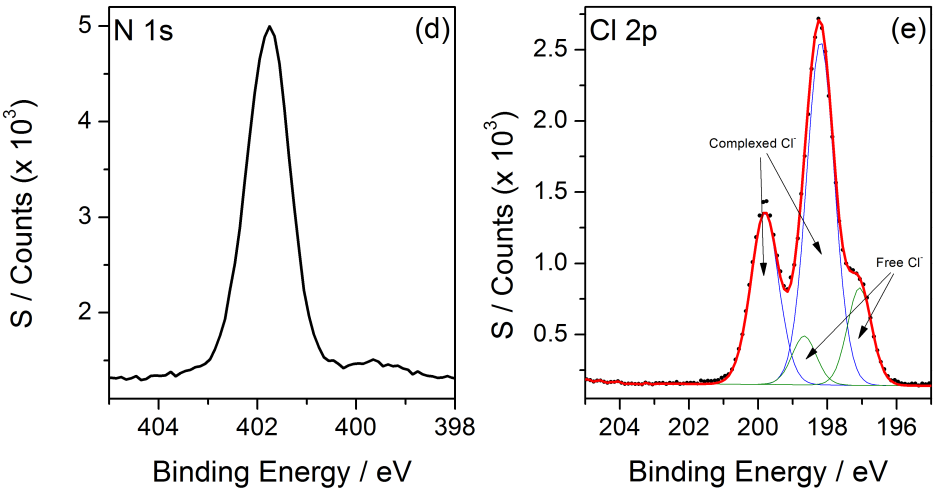
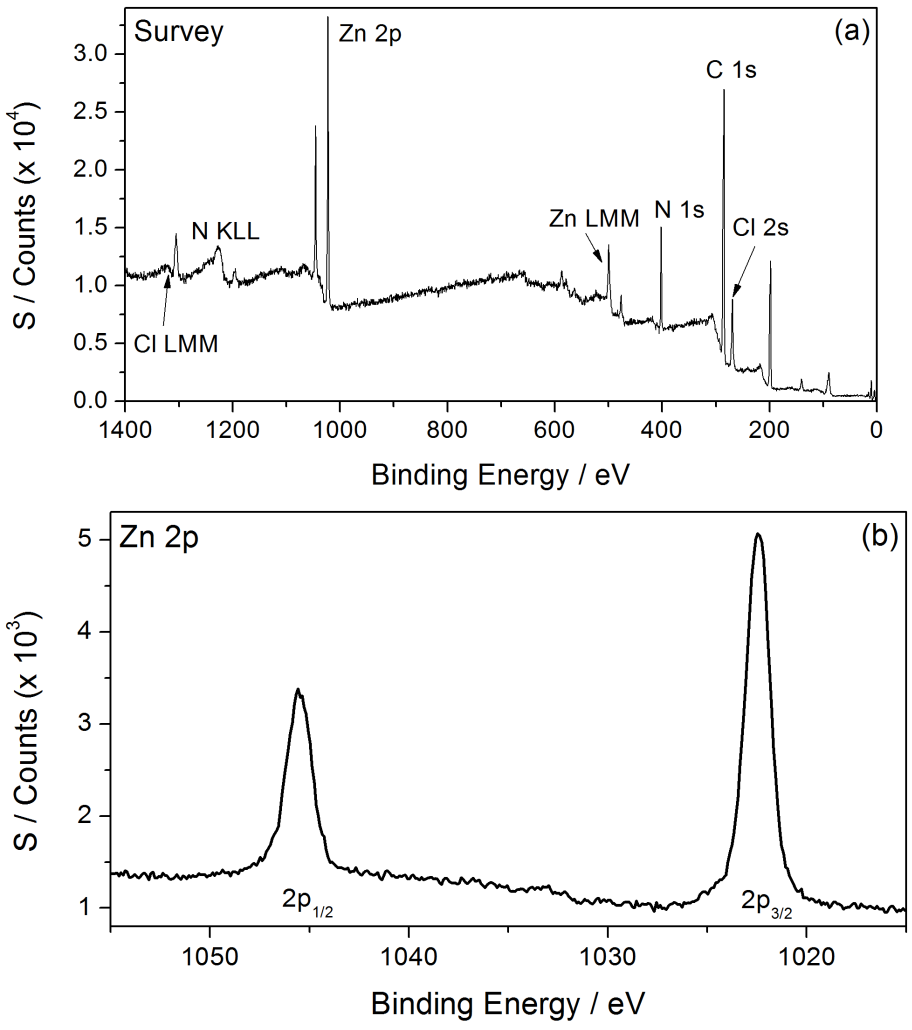


Figure S4 *(a) Survey scan and high resolution XP spectra of the (b) Zn 2p, (c) C 1s, (d) N 1s and (e) Cl 2p regions of* $[C_8C_1Im]Cl\text{-}Zn^{II}Cl_2$ *(*χ_{ZnCl2} *= 0.25). The components used to fit the C 1s XP spectrum are shown in (c), allowing the simulated envelope to be compared with the experimental spectrum (black dots). Absolute binding energies are given in Table 1; all spectra were charge corrected to* C_{aliph} *1s = 285.0 eV.*



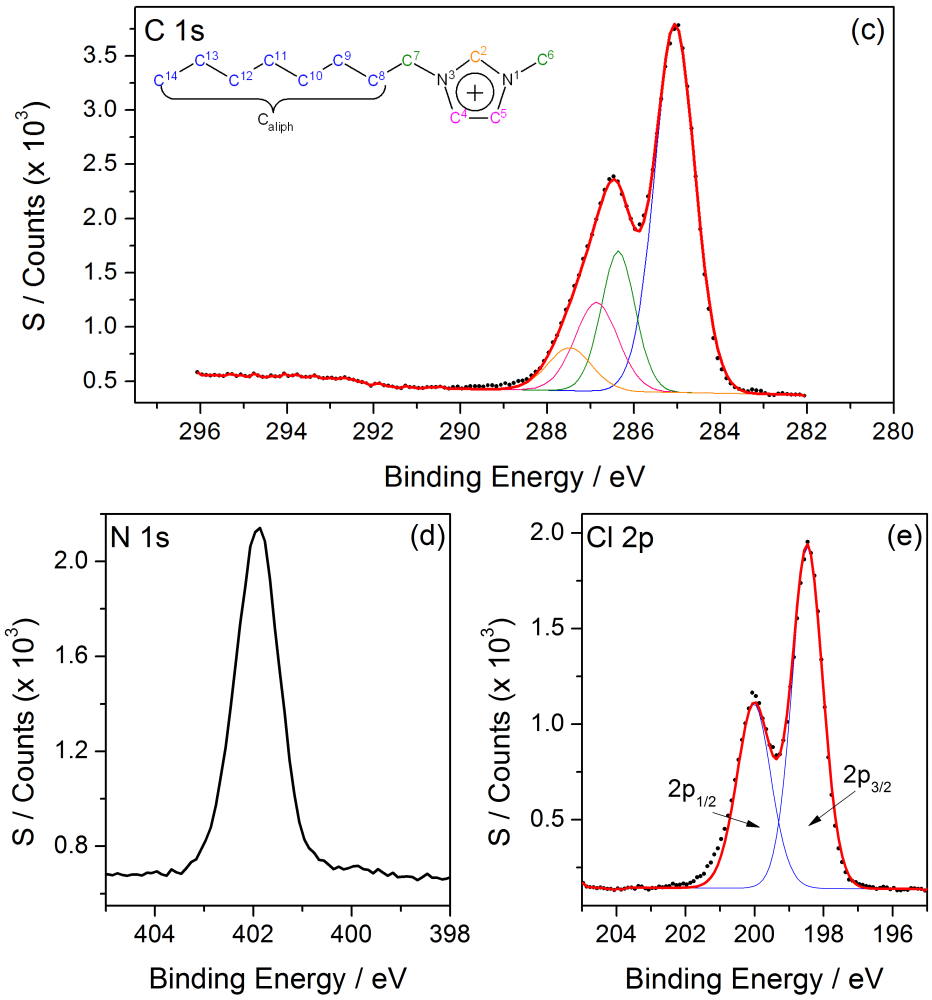
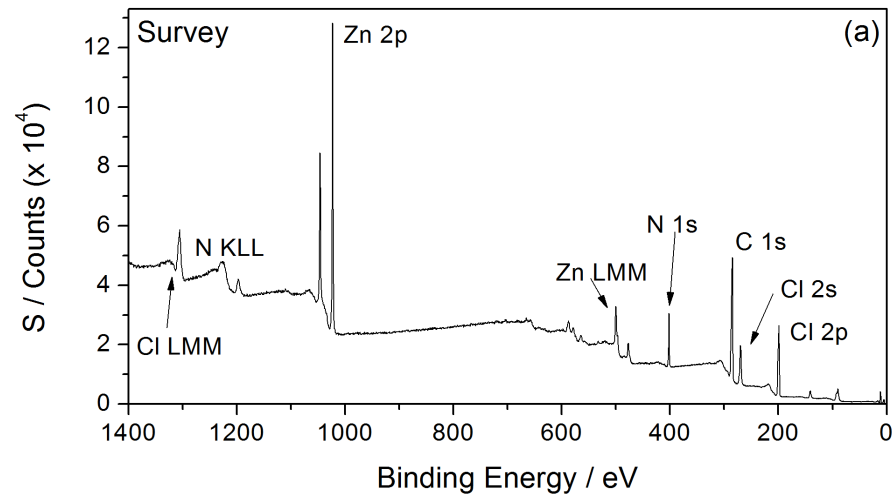


Figure S5 *(a) Survey scan and high resolution XP spectra of the (b) Zn 2p, (c) C 1s, (d) N 1s and (e) Cl 2p regions of* $[C_8C_1Im]Cl\text{-}Zn^{II}Cl_2$ *(*χZn_{Cl2} *= 0.33). The components used to fit the C 1s XP spectrum are shown in (c), allowing the simulated envelope to be compared with the experimental spectrum (black dots). Absolute binding energies are given in Table 1; all spectra were charge corrected to* C_{aliph} *1s = 285.0 eV.*



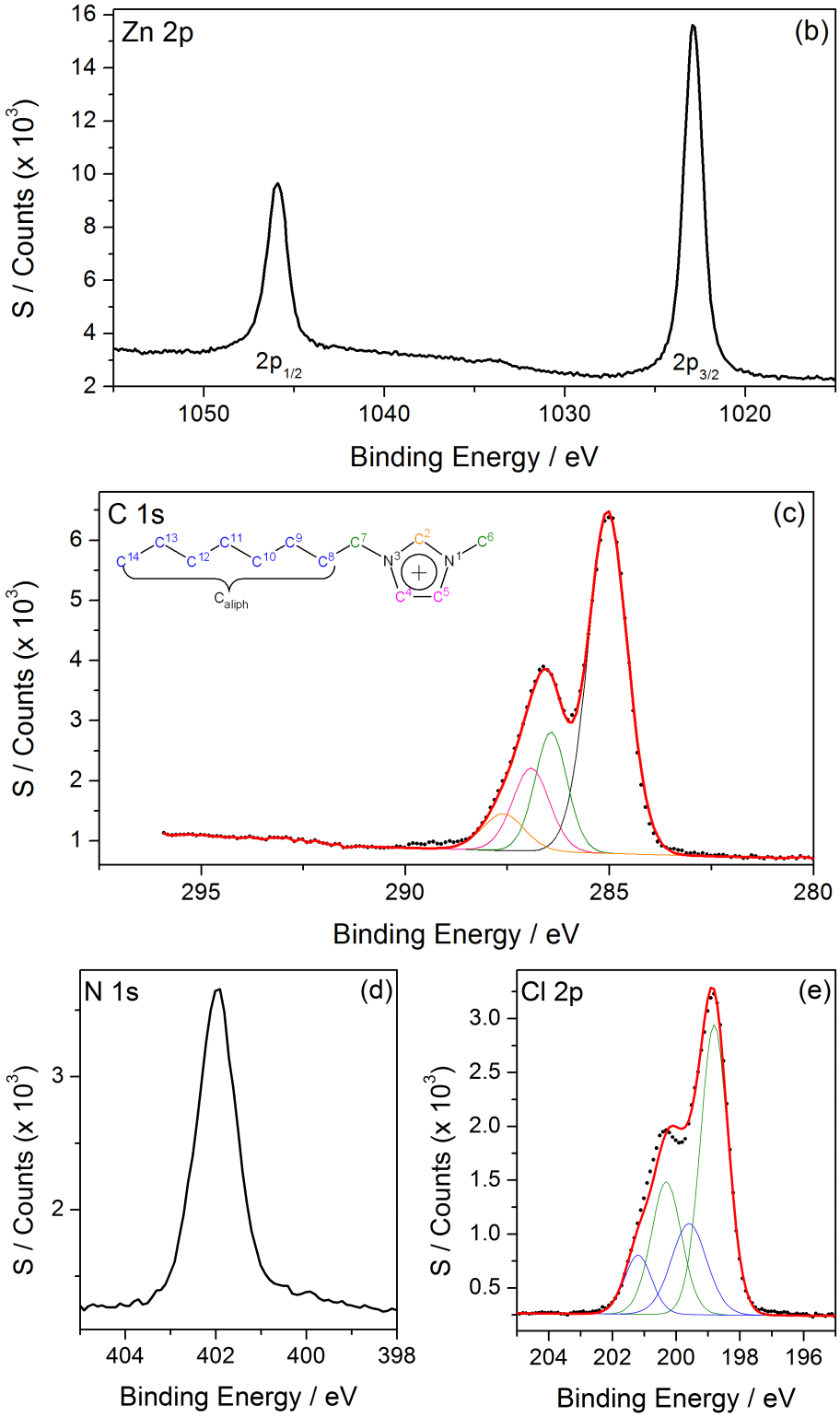
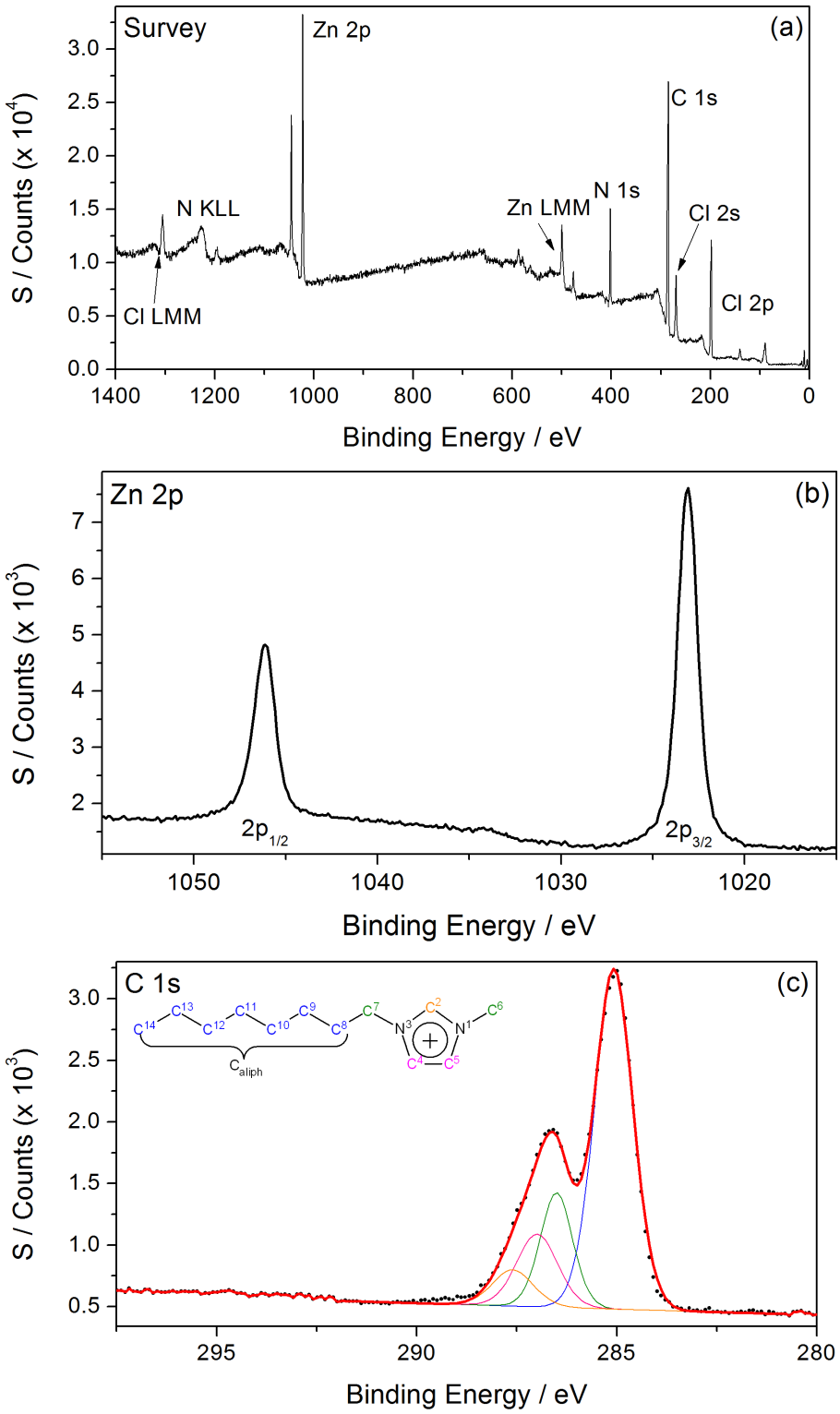


Figure S6 *(a) Survey scan and high resolution XP spectra of the (b) Zn 2p, (c) C 1s, (d) N 1s and (e) Cl 2p regions of* $[C_8C_1Im]Cl\text{-}Zn^{II}Cl_2$ *(*χ_{ZnCl2} *= 0.5). The components used to fit the C 1s XP spectrum are shown in (c), allowing the simulated envelope to be compared with the experimental spectrum (black dots). Absolute binding energies are given in Table 1; all spectra were charge corrected to* C_{aliph} *1s = 285.0 eV.*



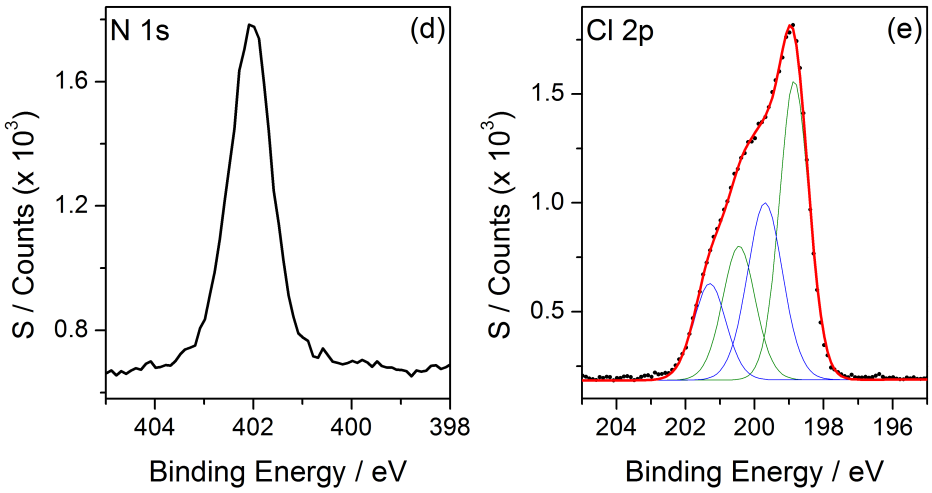


***Figure** S7 (a) Survey scan and high resolution XP spectra of the (b) Zn 2p, (c) C 1s, (d) N 1s and (e) Cl 2p regions of $[C_8C_1Im]Cl\text{-}Zn^{II}Cl_2$ (χ_{ZnCl2} = 0.6). The components used to fit the C 1s XP spectrum are shown in (c), allowing the simulated envelope to be compared with the experimental spectrum (black dots). Absolute binding energies are given in Table 1; all spectra were charge corrected to C_{aliph} 1s = 285.0 eV.*

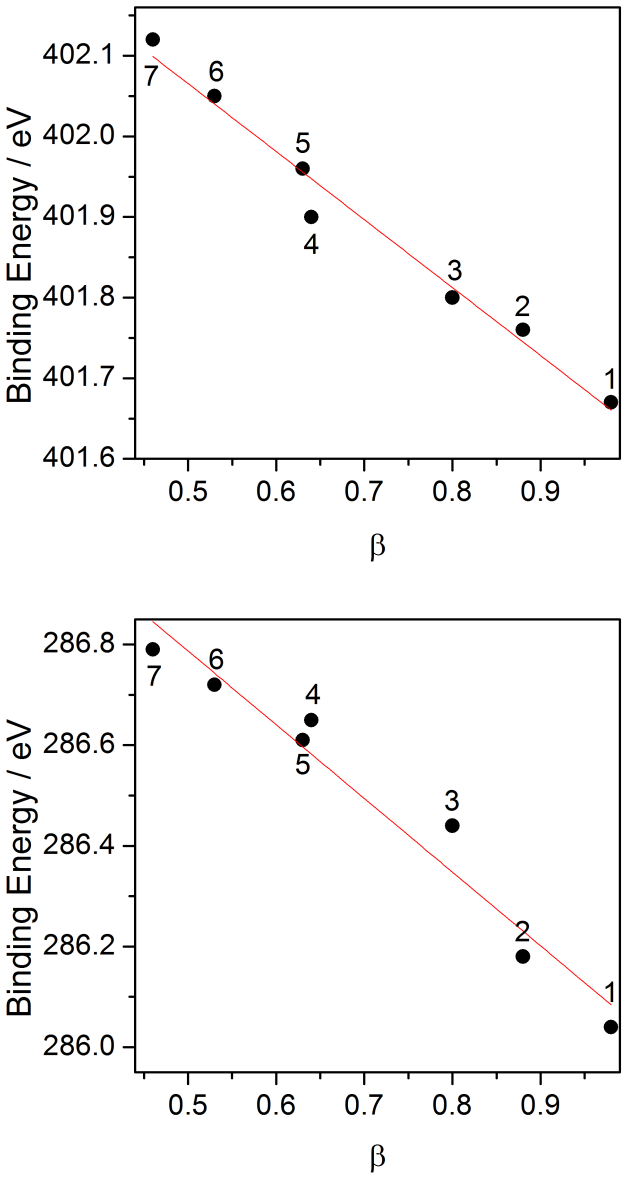


Figure S8 *(a) N 1s and (b) C_{hetero} 1s binding energies taken from the XP spectra of 7 common $[C_8C_1Im][X]$ ionic liquids plotted against β.*[1,2] *The anions, X, are 1 = Cl^-; 2 = Br^-; 3 = I^-; 4 = $[TfO]^-$; 5 = $[BF_4]^-$; 6 = $[PF_6]^-$; 7 = $[Tf_2N]^-$.*

References

1. I. J. Villar-Garcia, E. F. Smith, A. W. Taylor, F. Qiu, K. R. J. Lovelock, R. G. Jones and P. Licence, *Phys. Chem. Chem. Phys.*, 2011, **13**, 2797-2808.
2. R. Lungwitz and S. Spange, *New J. Chem.*, 2008, **32**, 392-394.