Electronic Supplementary Information

for

Imidazolium-based ionic liquids with large weakly coordinating anions

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Contents

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X-ray structure of [BMPYRR][BAr^F]

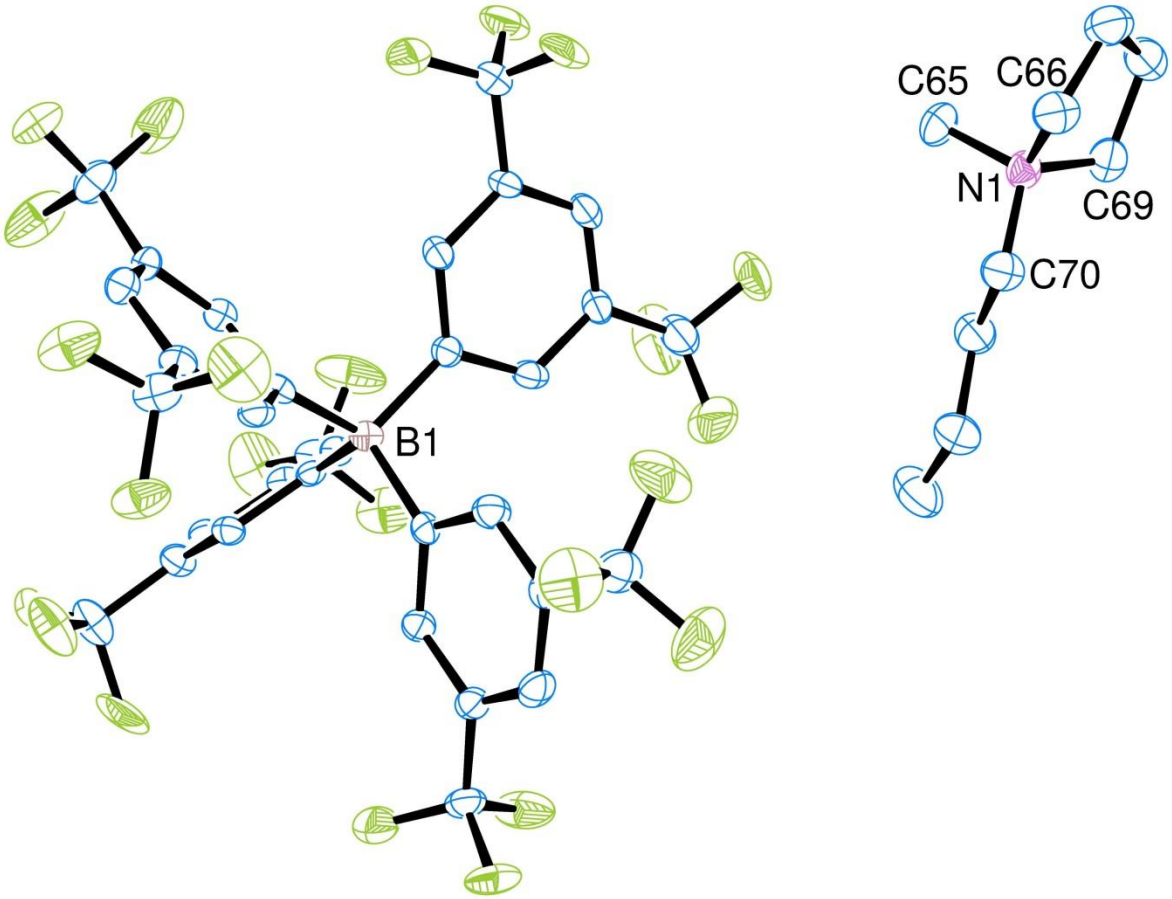

Figure S1: ORTEP representation of [BMPYRR][BAr^F] showing one of two molecules in the asymmetric unit. Thermal ellipsoids are drawn at 50% probability and hydrogen atoms are omitted for clarity. For the X-ray CIF data, see Table 1 of the main manuscript.

DSC traces

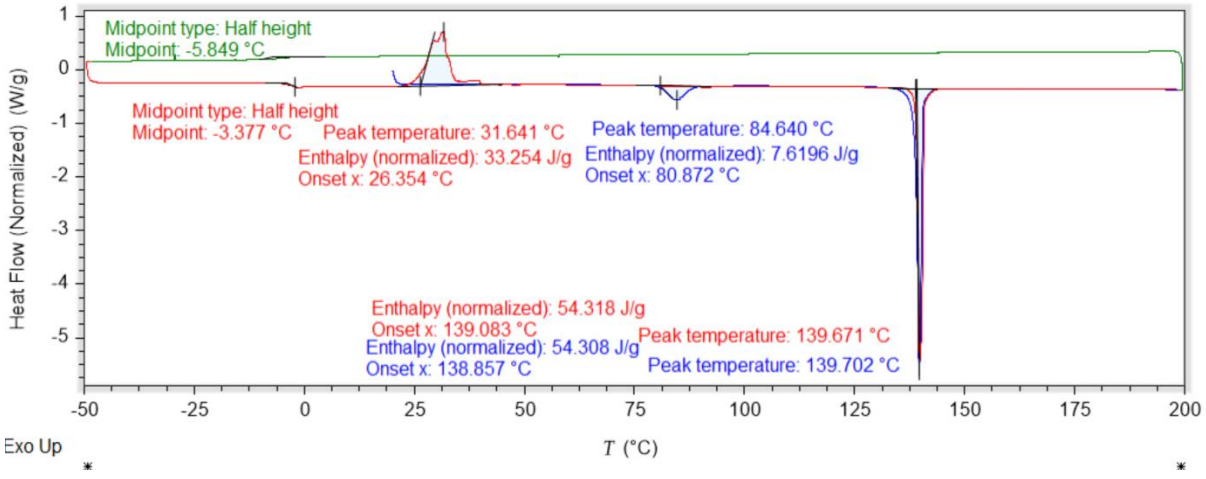

Figure S2: DSC trace for [EMIM][BAr^F]. Key: blue = first heating cycle, green = cooling cycle, red = second heating cycle.

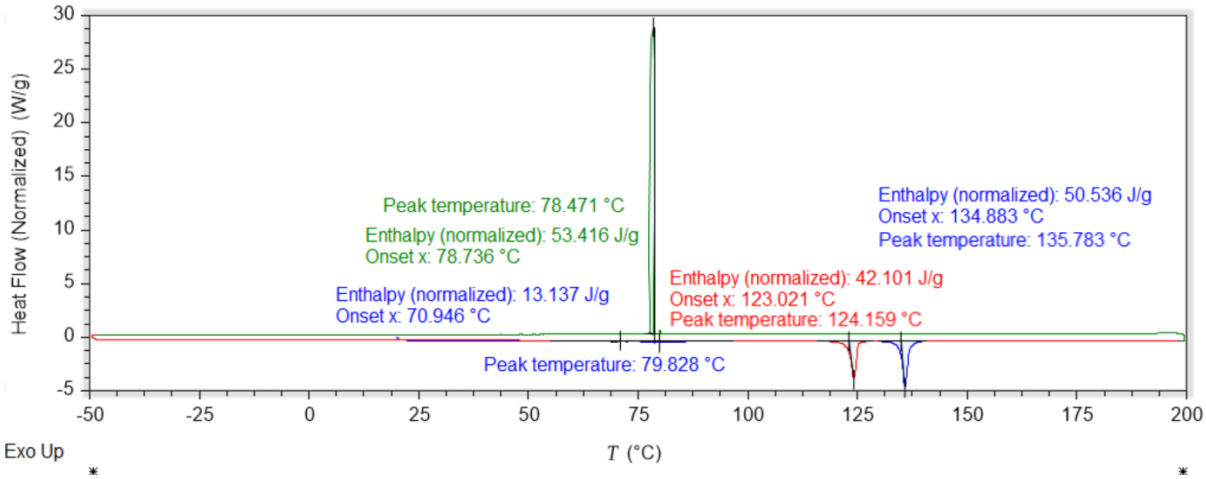

Figure S3: DSC trace for [EDMIM][BAr^F]. Key: blue = first heating cycle, green = cooling cycle, red = second heating cycle.

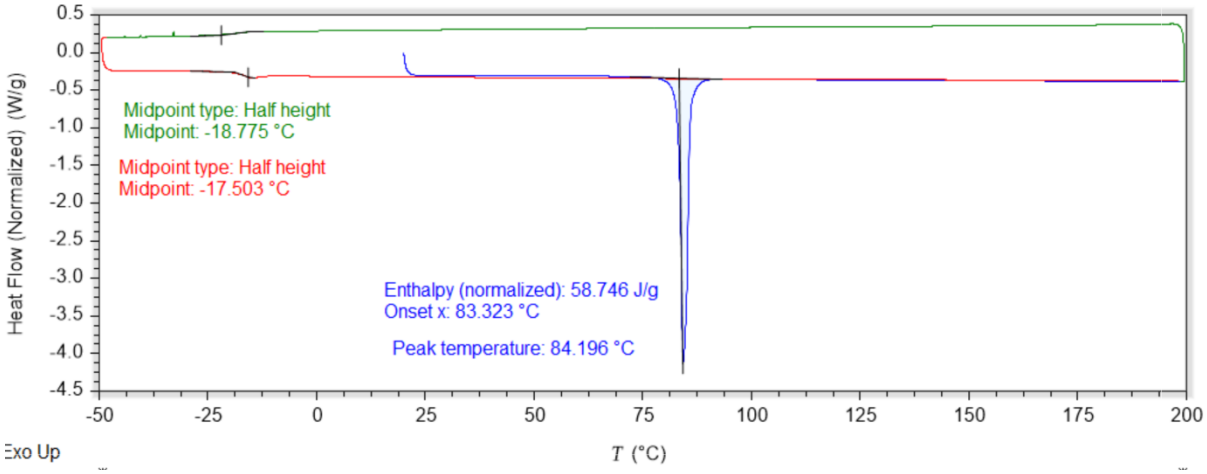

Figure S4: DSC trace for [HMIM][BAr^F]. Key: blue = first heating cycle, green = cooling cycle, red = second heating cycle.

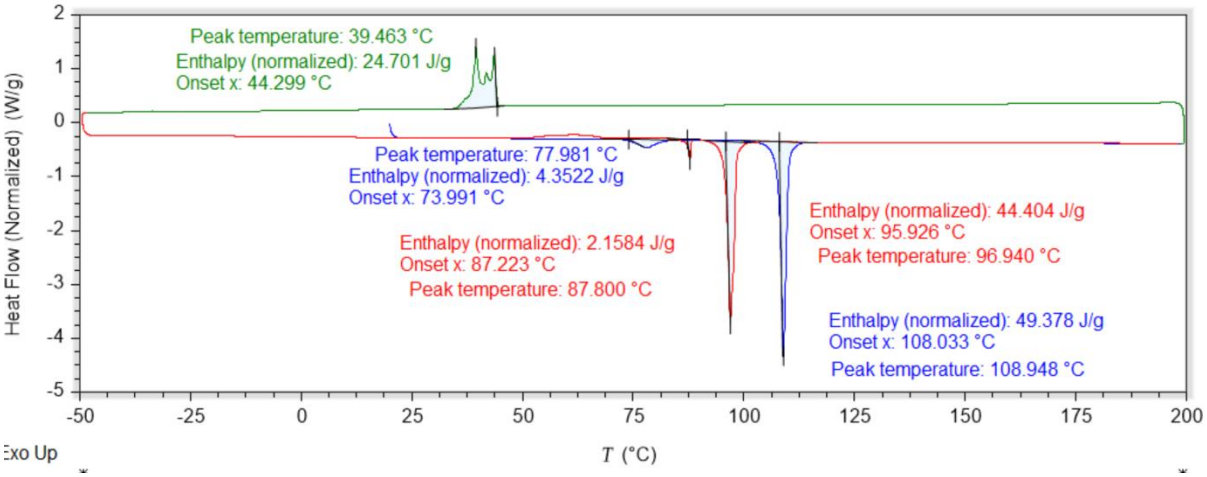

Figure S5: DSC trace for [EMBIM][BAr^F]. Key: blue = first heating cycle, green = cooling cycle, red = second heating cycle.

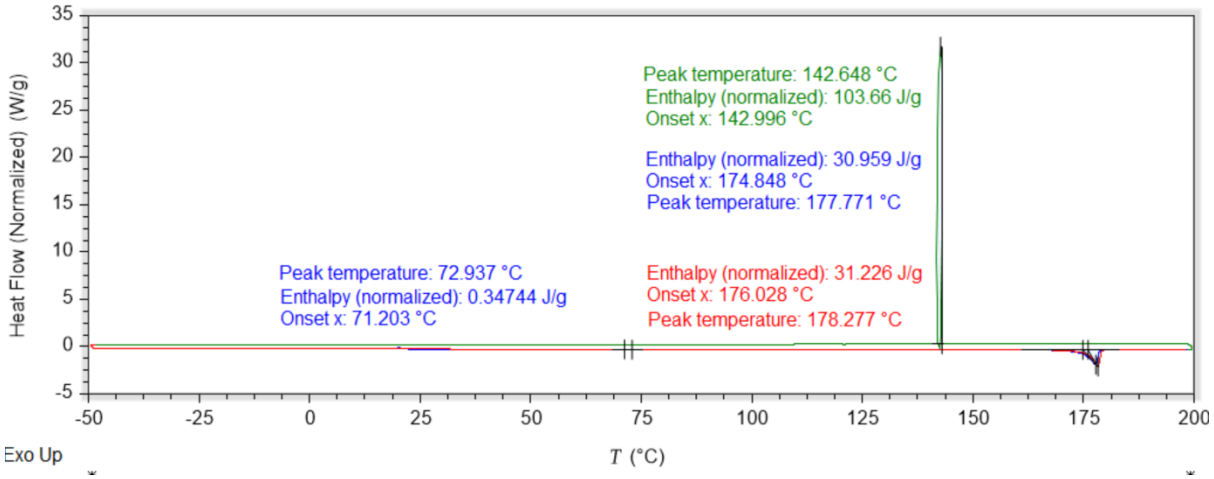

Figure S6: DSC trace for [EMIM][Al(O^{t}C$_4$F$_9$)$_4$]. Key: blue = first heating cycle, green = cooling cycle, red = second heating cycle.

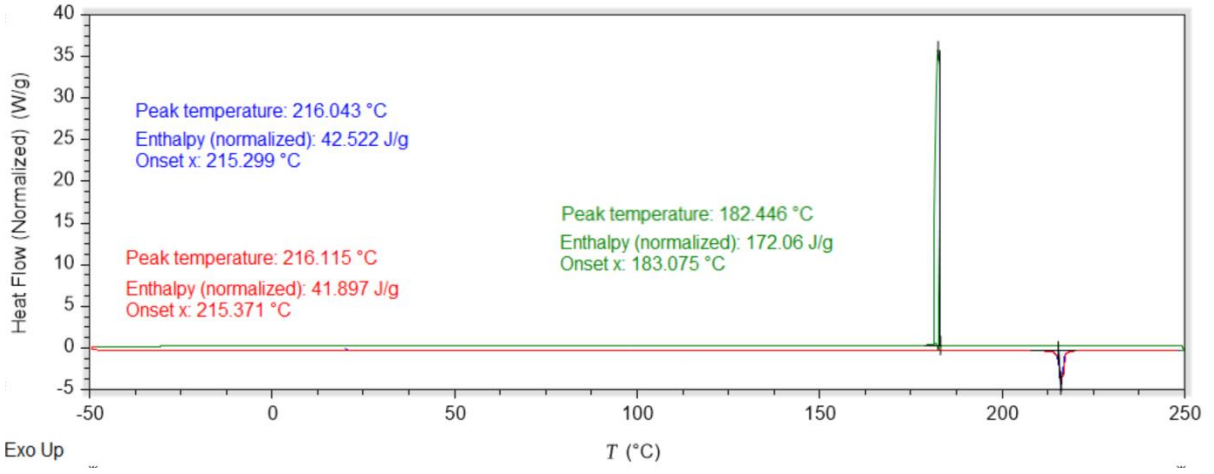

Figure S7: DSC trace for [EDMIM][Al(O^{t}C$_4$F$_9$)$_4$]. Key: blue = first heating cycle, green = cooling cycle, red = second heating cycle.

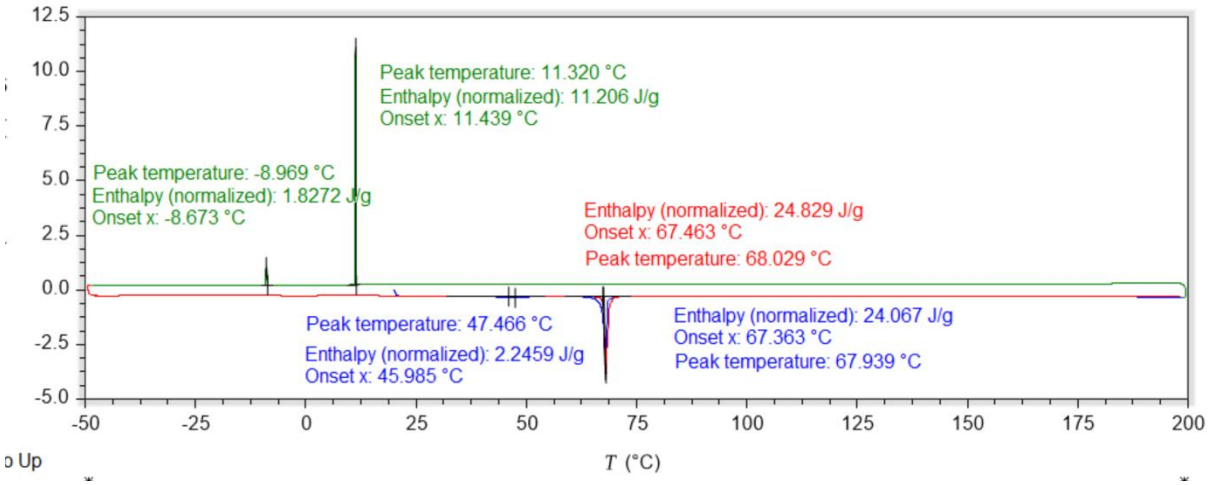

Figure S8: DSC trace for [HMIM][Al(O^{t}C$_4$F$_9$)$_4$]. Key: blue = first heating cycle, green = cooling cycle, red = second heating cycle.

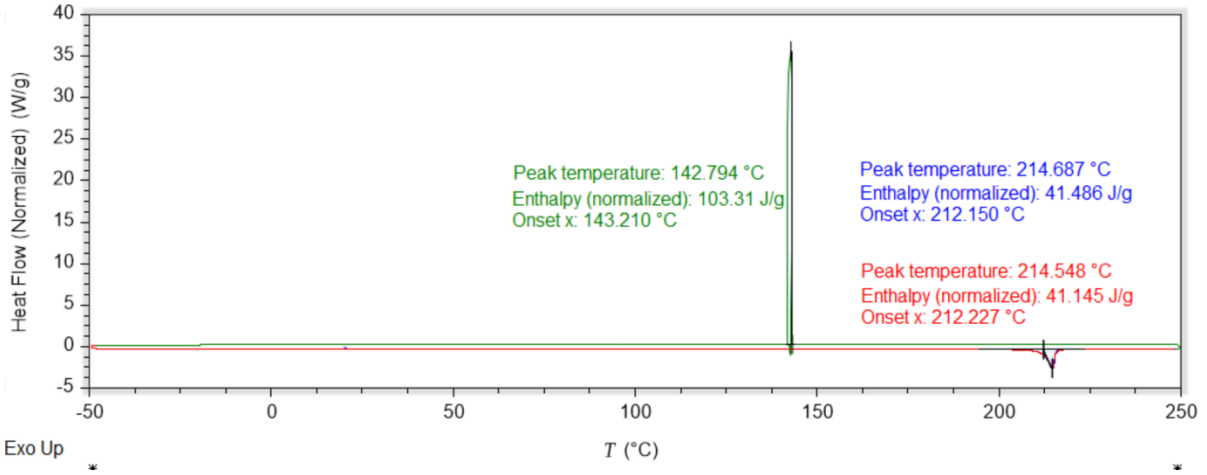

Figure S9: DSC trace for [EMBIM][Al(O^{t}C$_4$F$_9$)$_4$]. Key: blue = first heating cycle, green = cooling cycle, red = second heating cycle.

Spectral Data

[EMIM][BAr^F]:

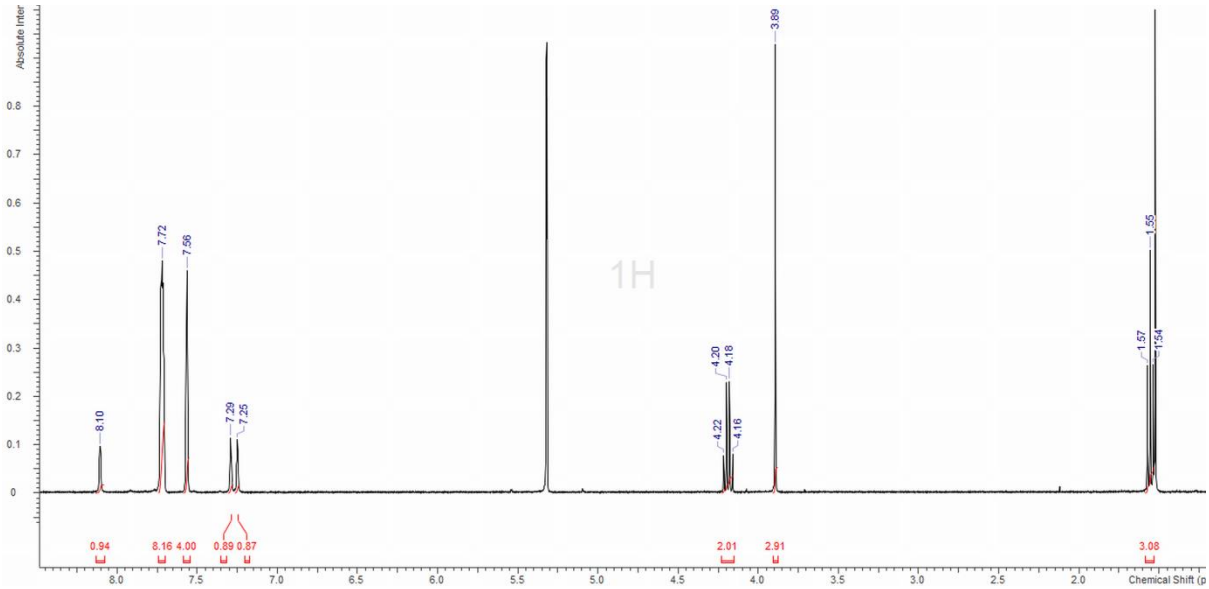

Figure S10: ^{1}H NMR spectrum (CD_2Cl_2, 298 K).

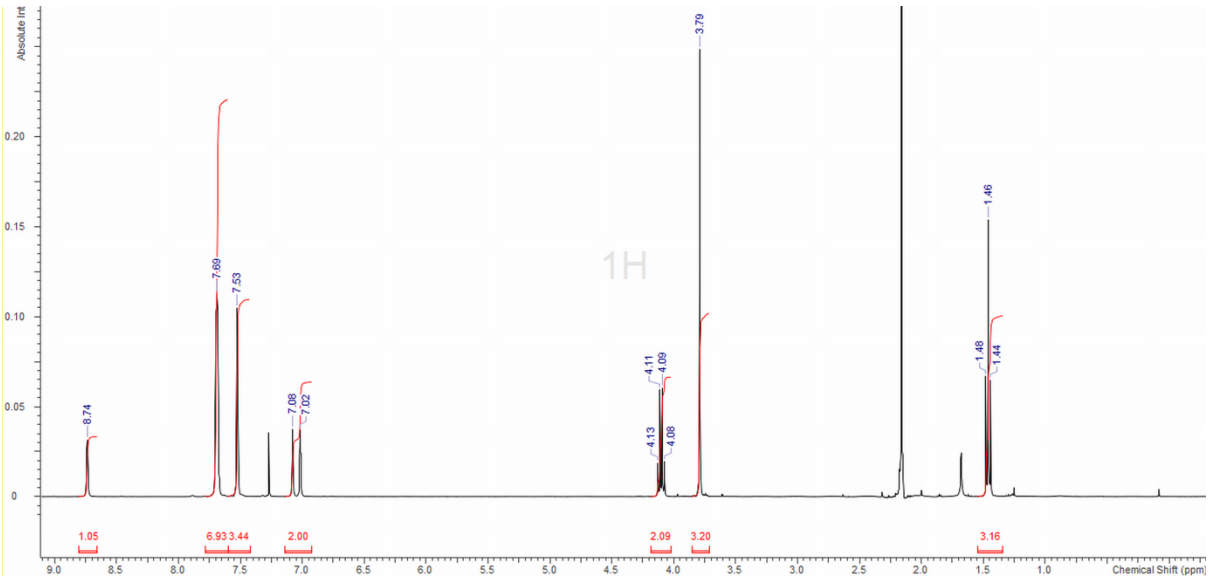

Figure S11: ^{1}H NMR spectrum ($CDCl_3$, 298 K).

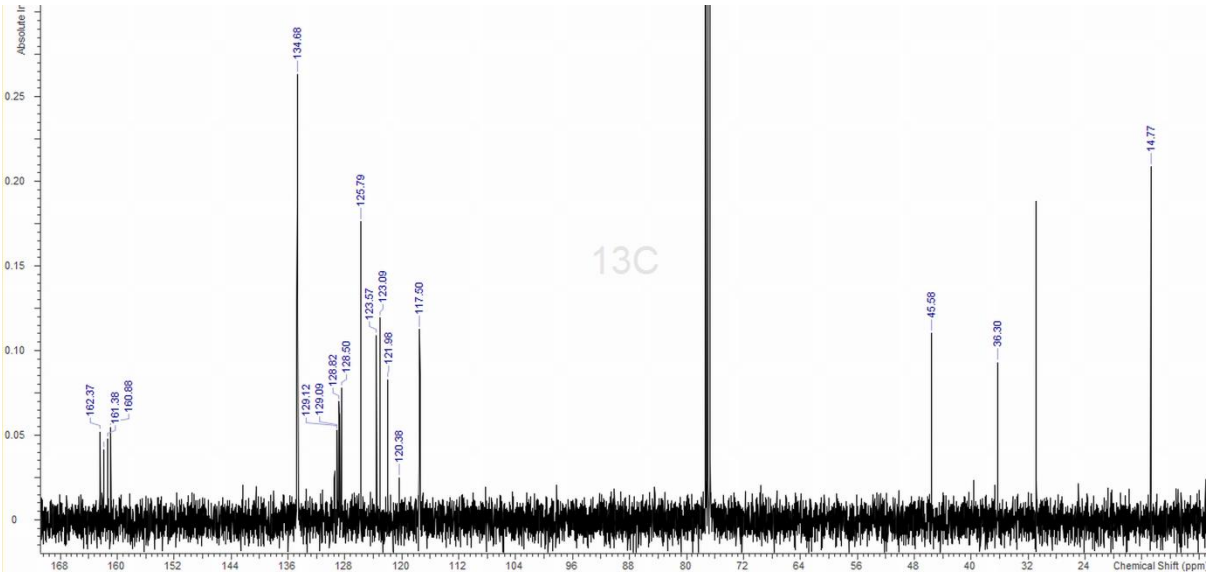

Figure S12: $^{13}C\{^{1}H\}$ NMR spectrum ($CDCl_3$, 298 K).

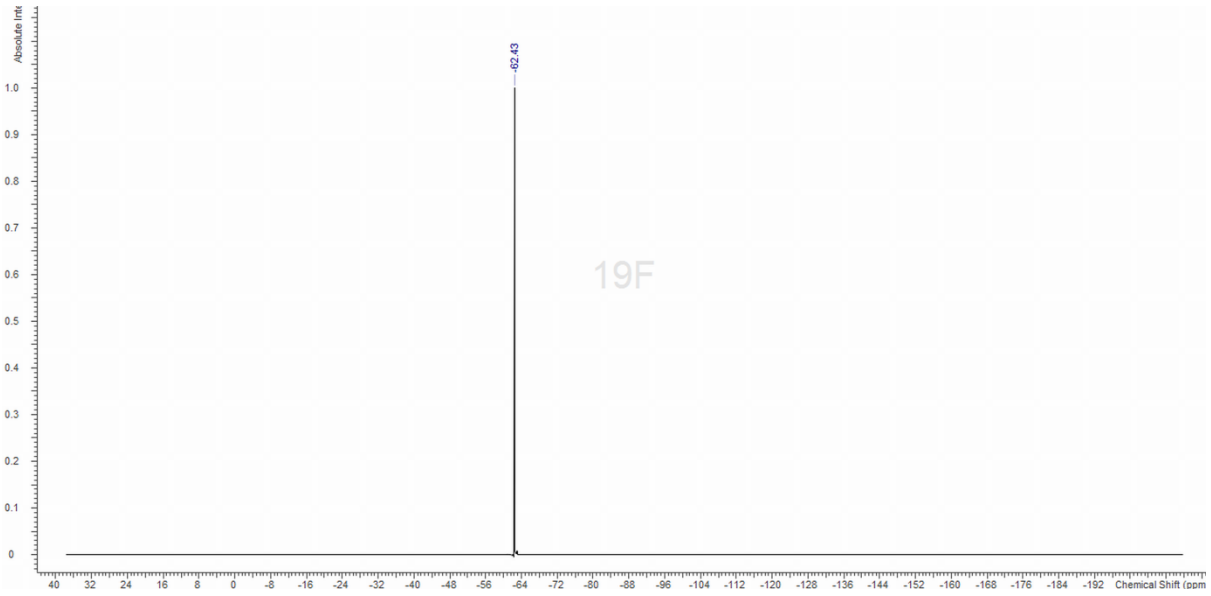

Figure S13: $^{19}F\{^{1}H\}$ NMR spectrum ($CDCl_3$, 298 K).

[EDMIM][BAr^F]:

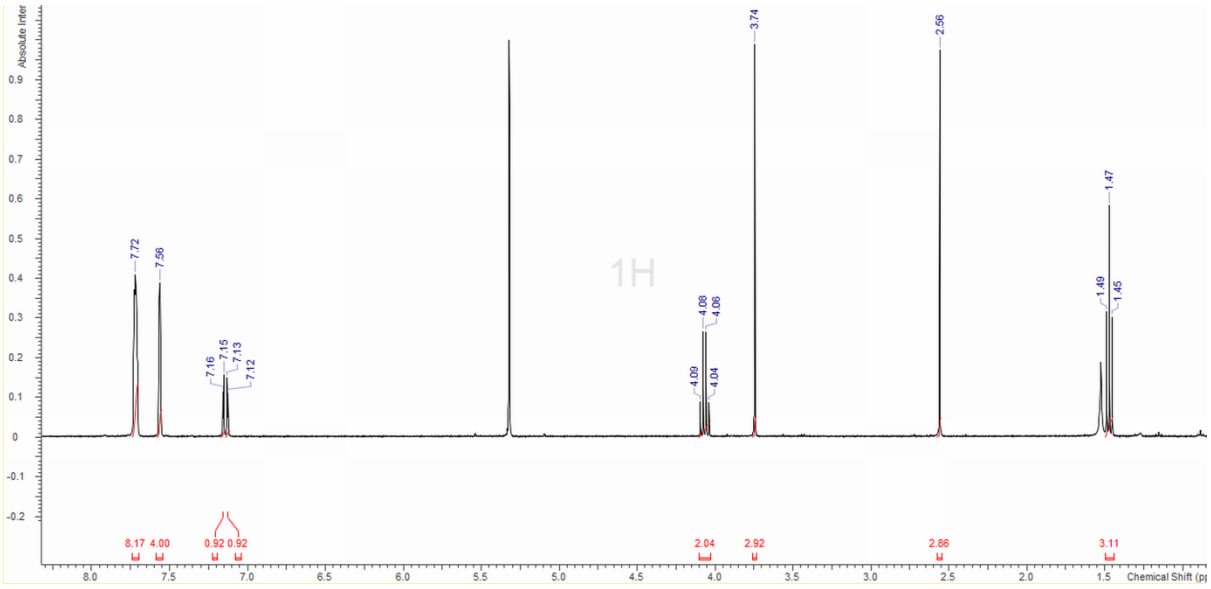

Figure S14: ^{1}H NMR spectrum (CD_2Cl_2, 298 K).

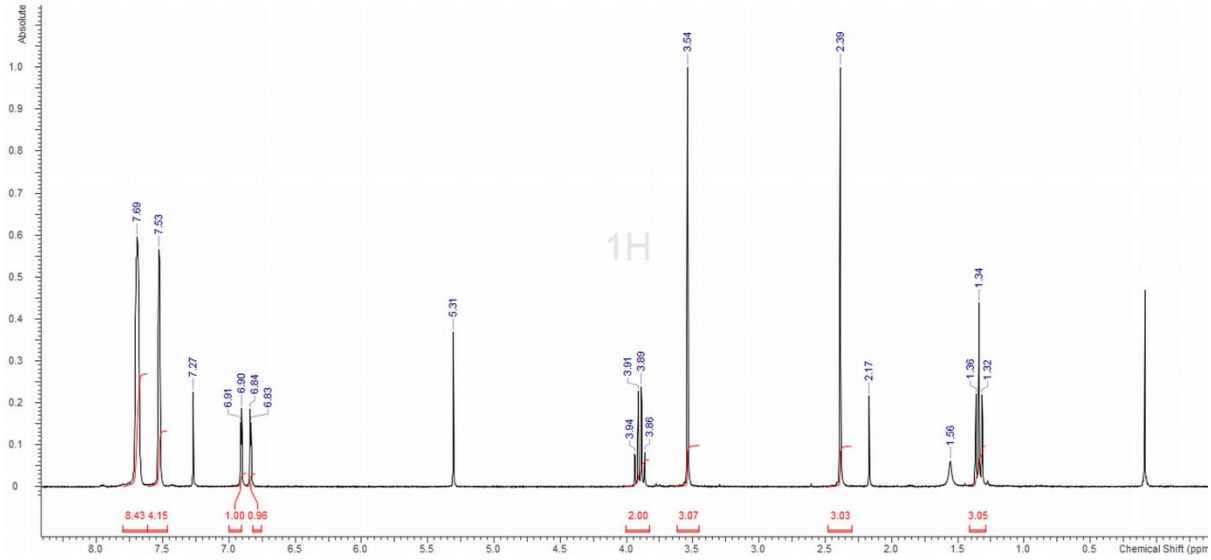

Figure S15: ^{1}H NMR spectrum ($CDCl_3$, 298 K).

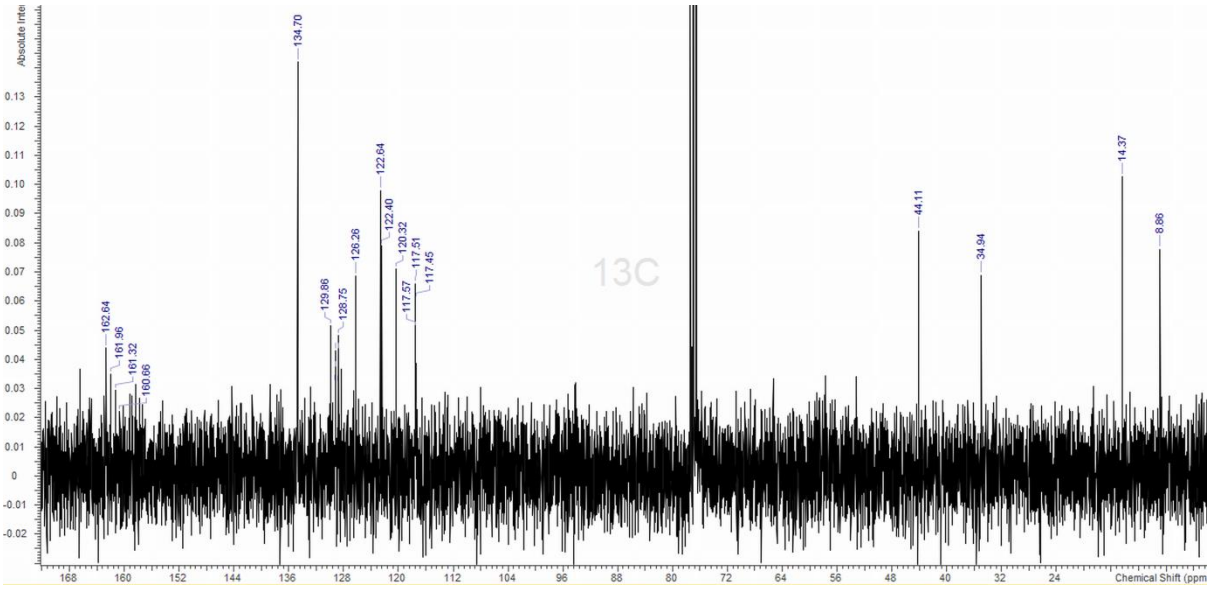

Figure S16: $^{13}C\{^{1}H\}$ NMR spectrum ($CDCl_3$, 298 K).

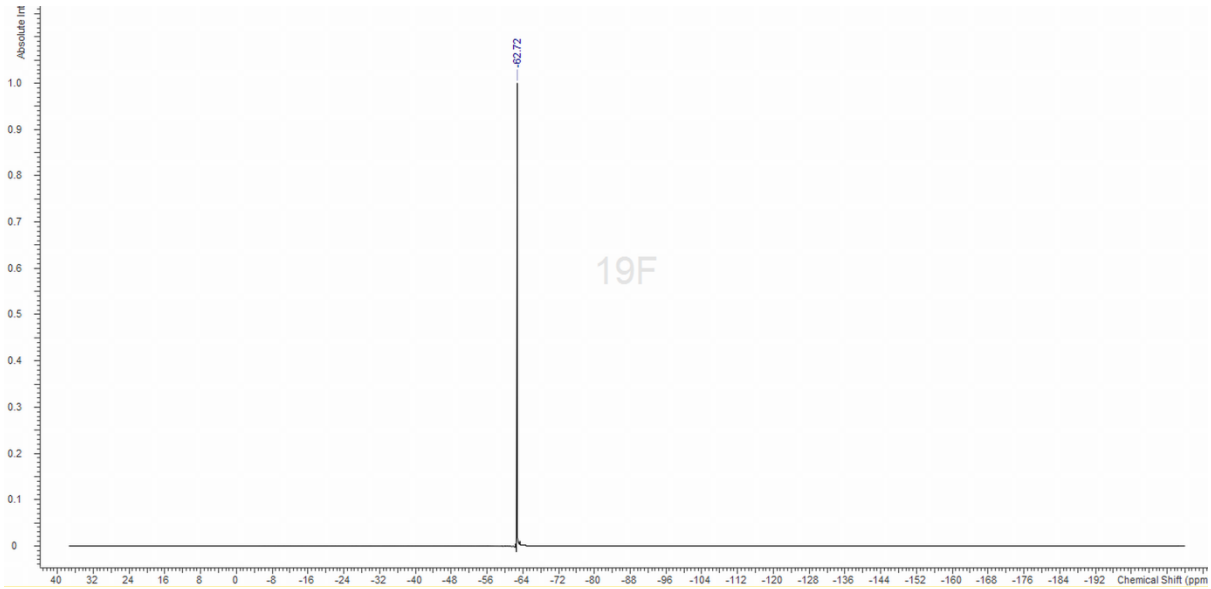

Figure S17: $^{19}F\{^{1}H\}$ NMR spectrum ($CDCl_3$, 295 K).

[HMIM][BAr^F]:

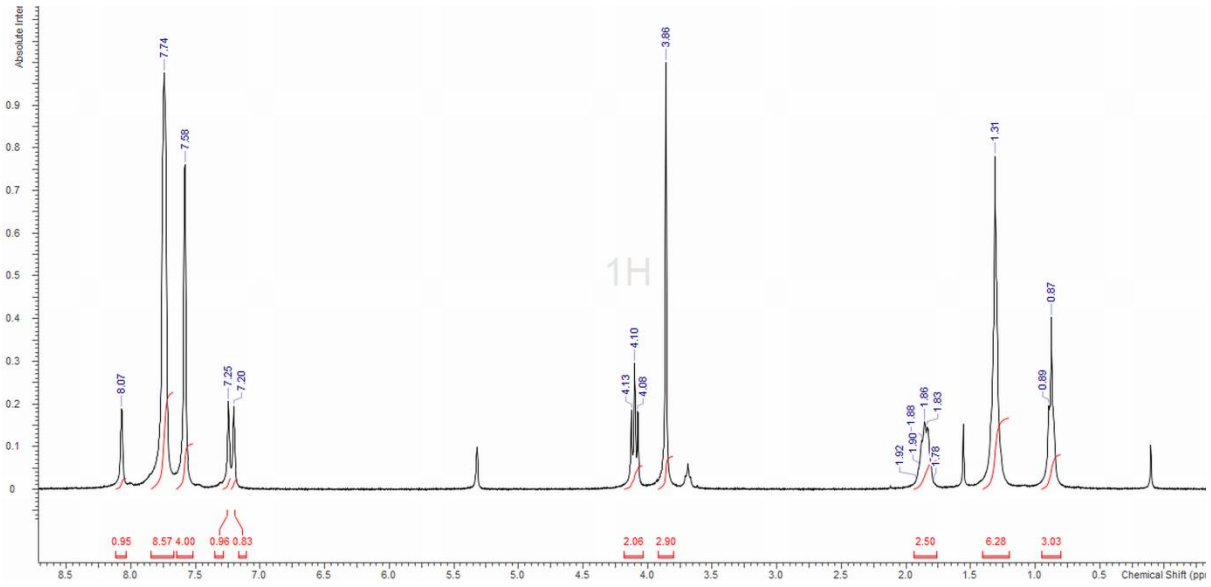

Figure S18: ^{1}H NMR spectrum (CD_2Cl_2, 298 K).

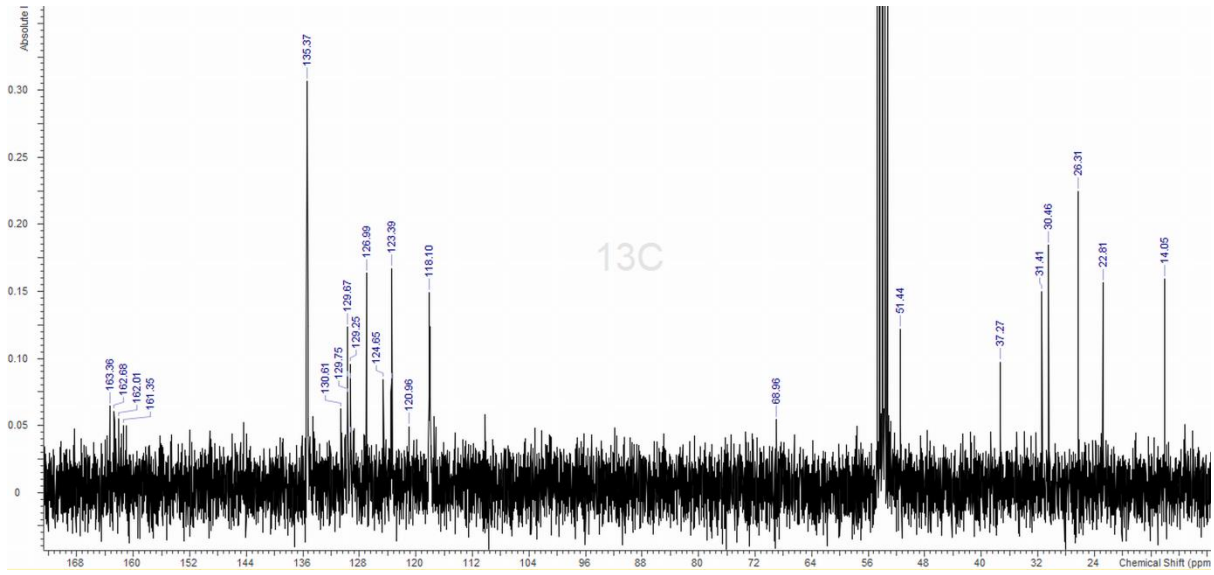

Figure S19: $^{13}C\{^1H\}$ NMR spectrum (CD_2Cl_2, 298 K).

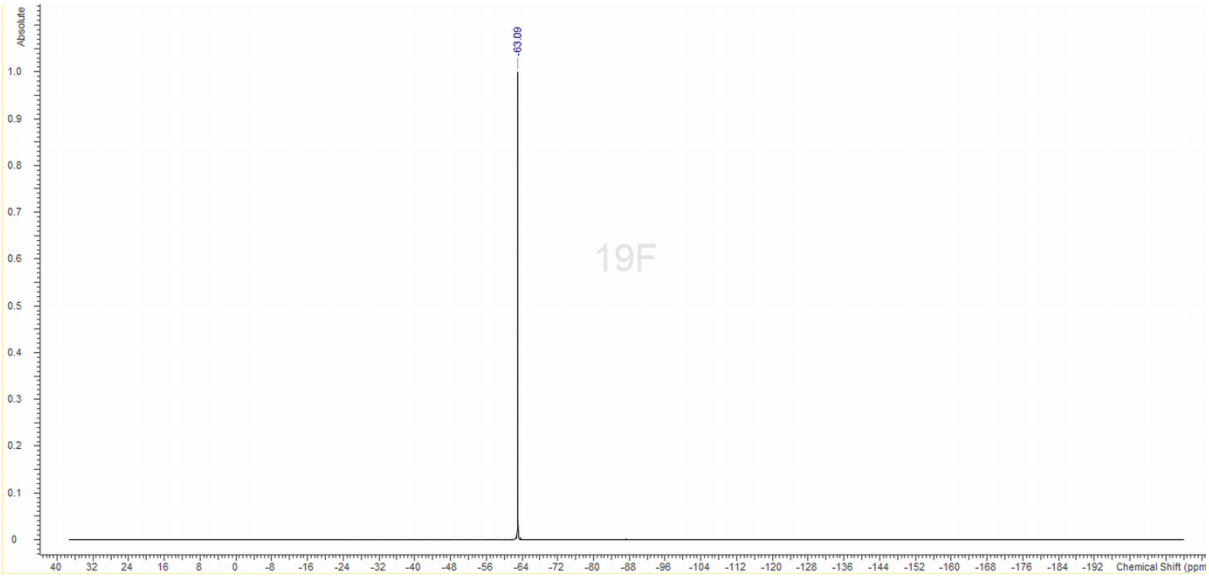

Figure S20: $^{19}F\{^{1}H\}$ NMR spectrum (CD_2Cl_2, 298 K).

[EMBIM][BAr^{F}]:

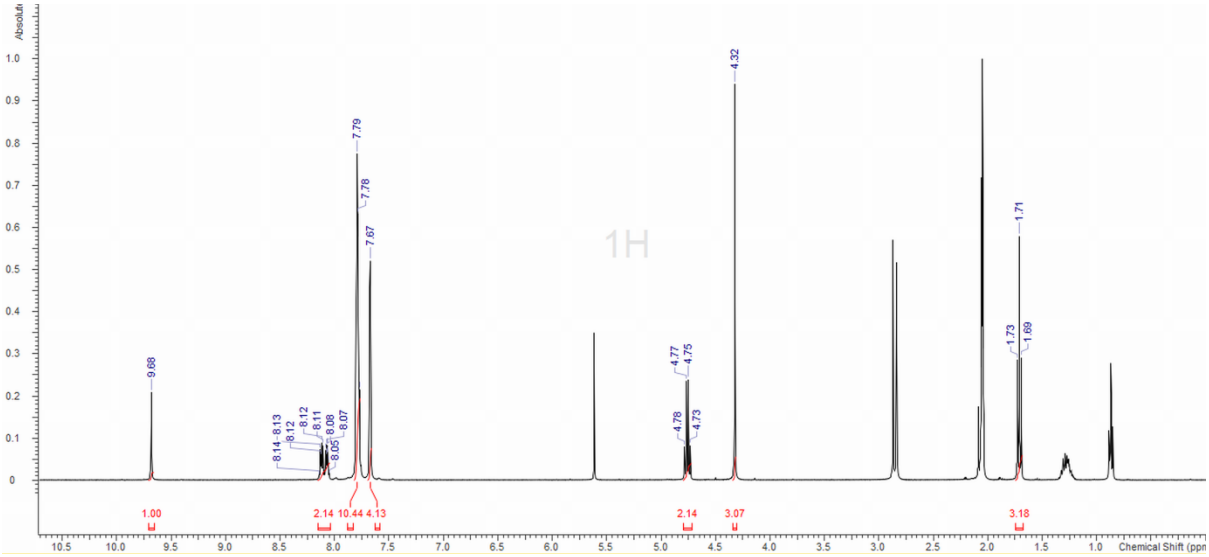

Figure S21: ^{1}H NMR spectrum (CD_2Cl_2, 298 K).

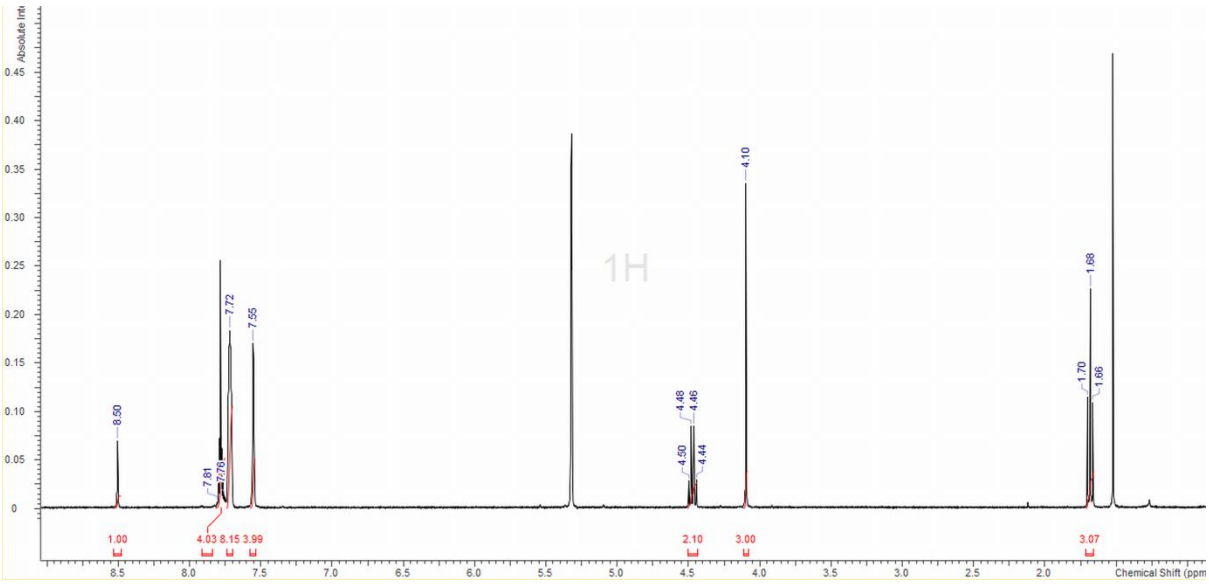

Figure S22: ^{1}H NMR spectrum ($(CD_3)_2CO$, 298 K).

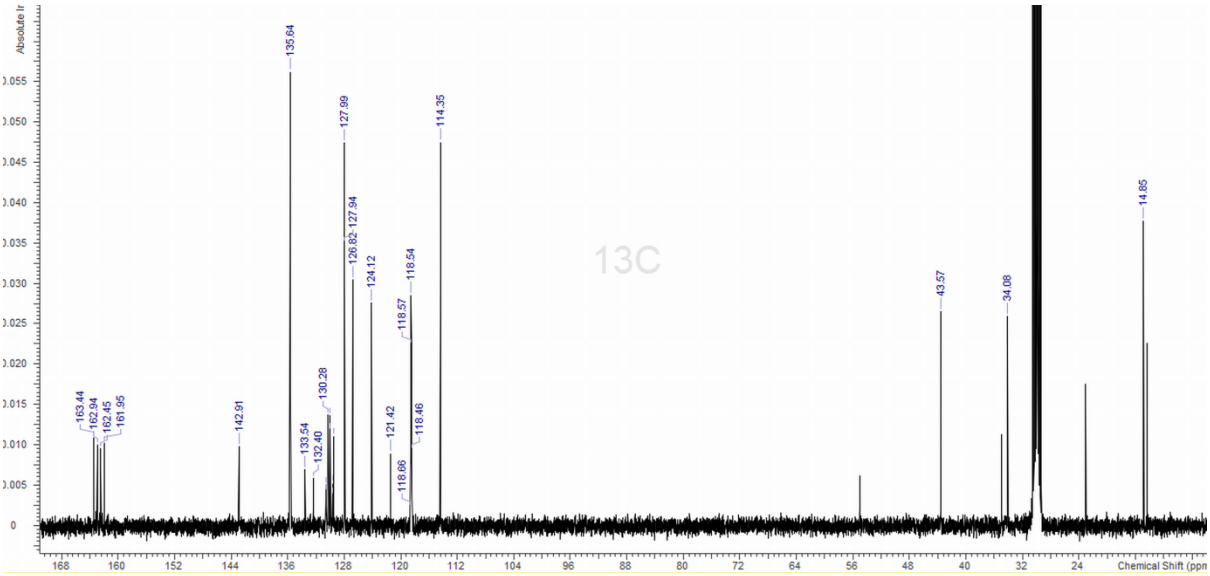

Figure S23: $^{13}C\{^{1}H\}$ NMR spectrum ($(CD_3)_2CO$, 298 K).

[IDiPPH][BAr^F]:

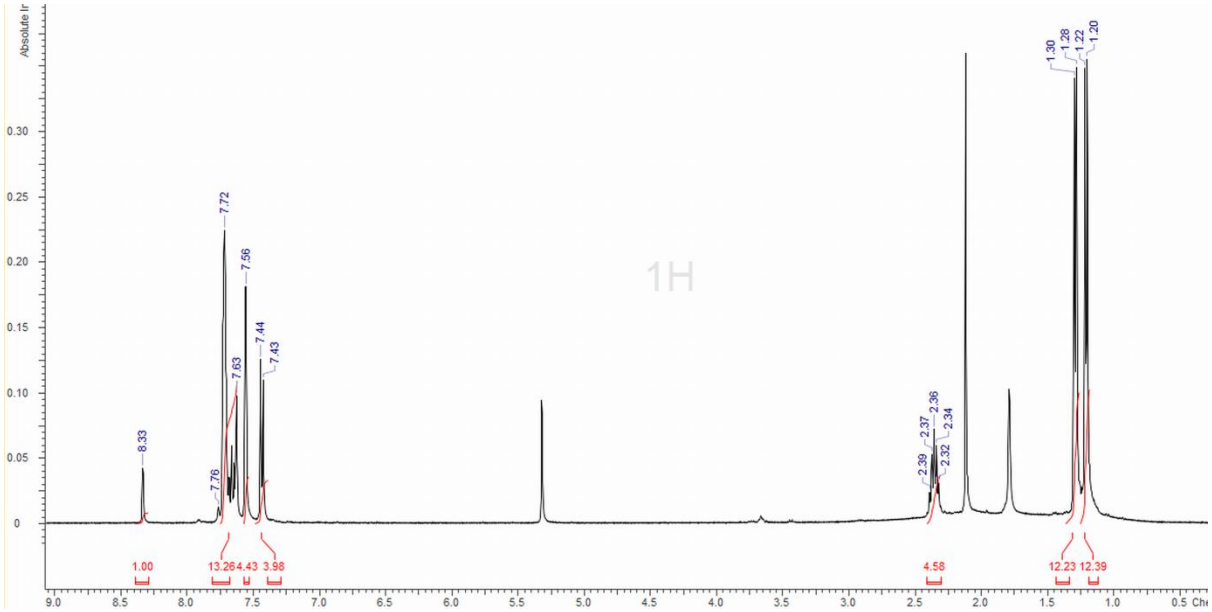

Figure S24: ^{1}H NMR spectrum (CD_2Cl_2, 298 K).

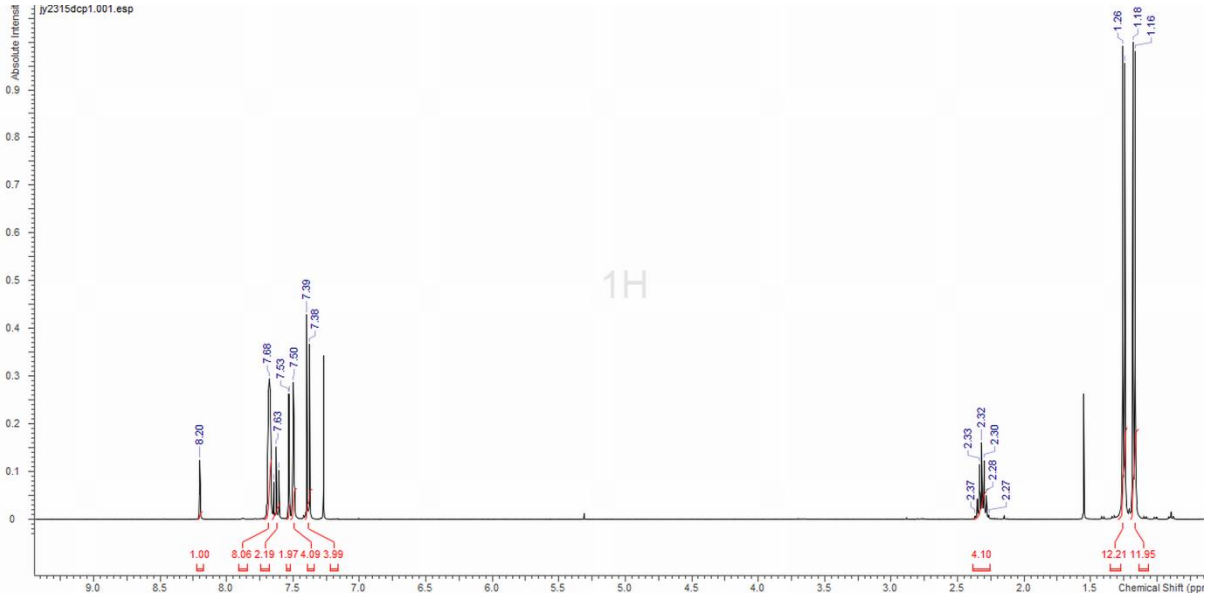

Figure S25: ^{1}H NMR spectrum ($CDCl_3$, 298 K).

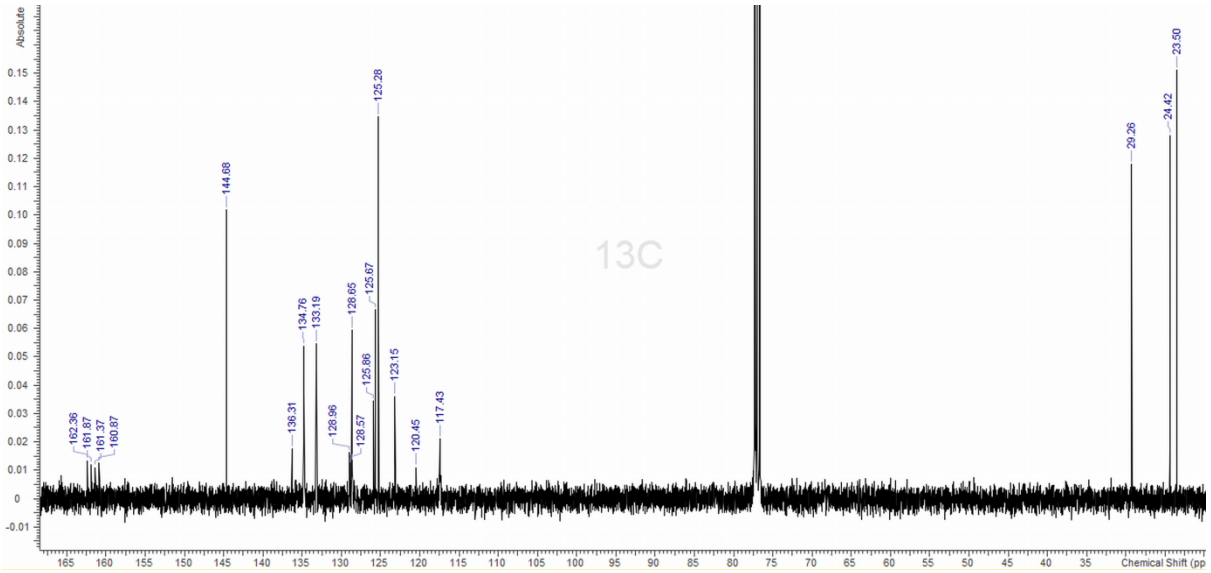

Figure S26: $^{13}C\{^{1}H\}$ NMR spectrum ($CDCl_3$, 298 K).

[BMPYRR][BAr^F]:

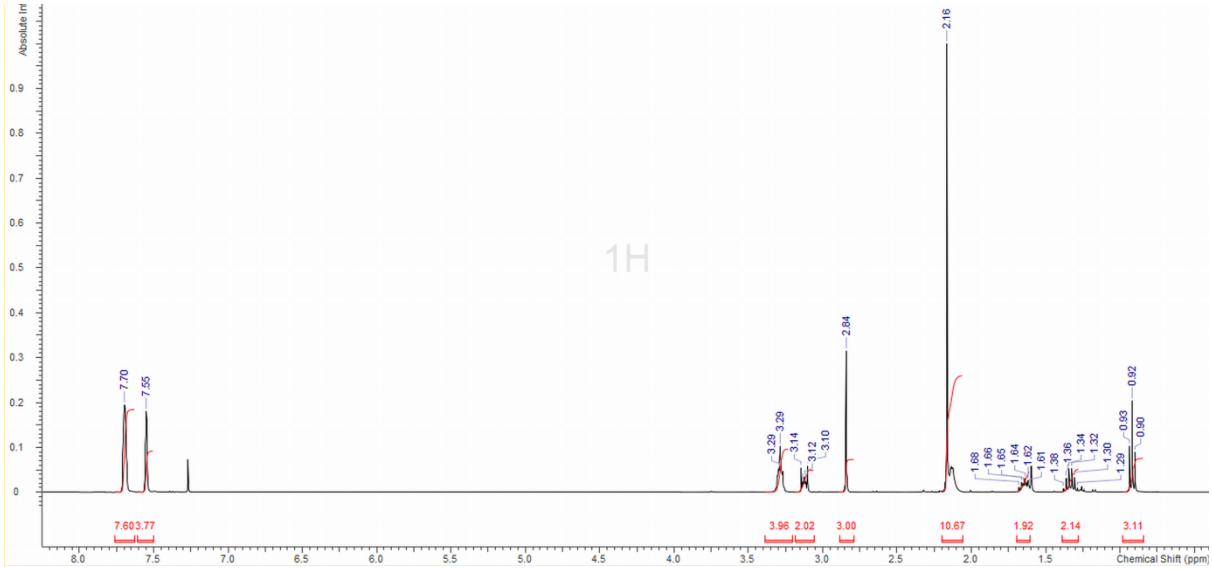

Figure S27: ^{1}H NMR spectrum ($CDCl_3$, 298 K).

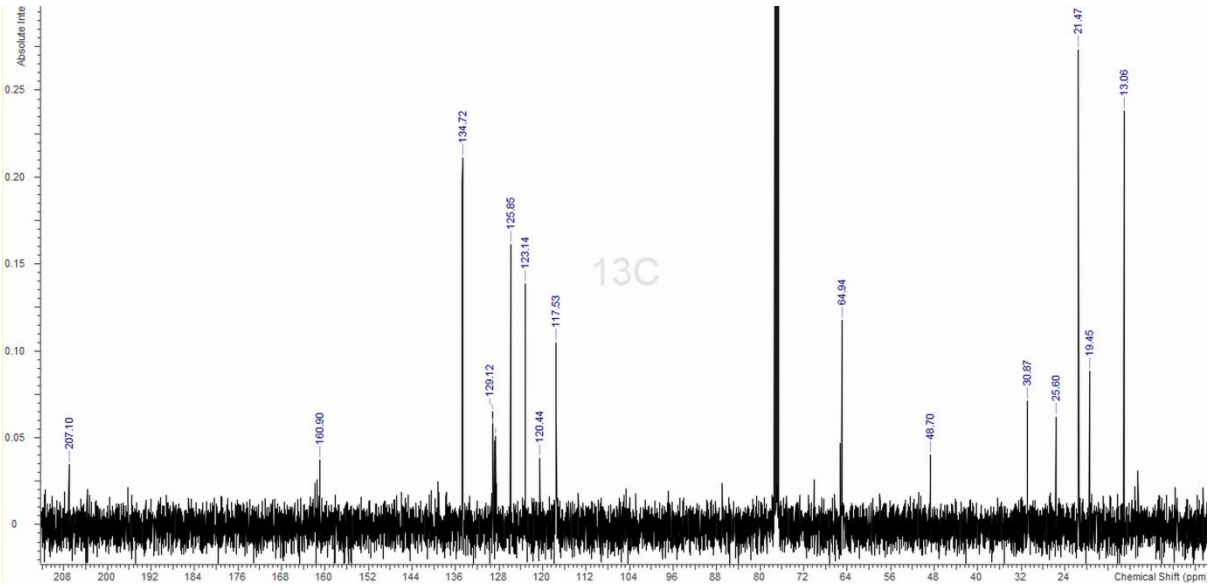

Figure S28: $^{13}C\{^1H\}$ NMR spectrum ($CDCl_3$, 298 K).

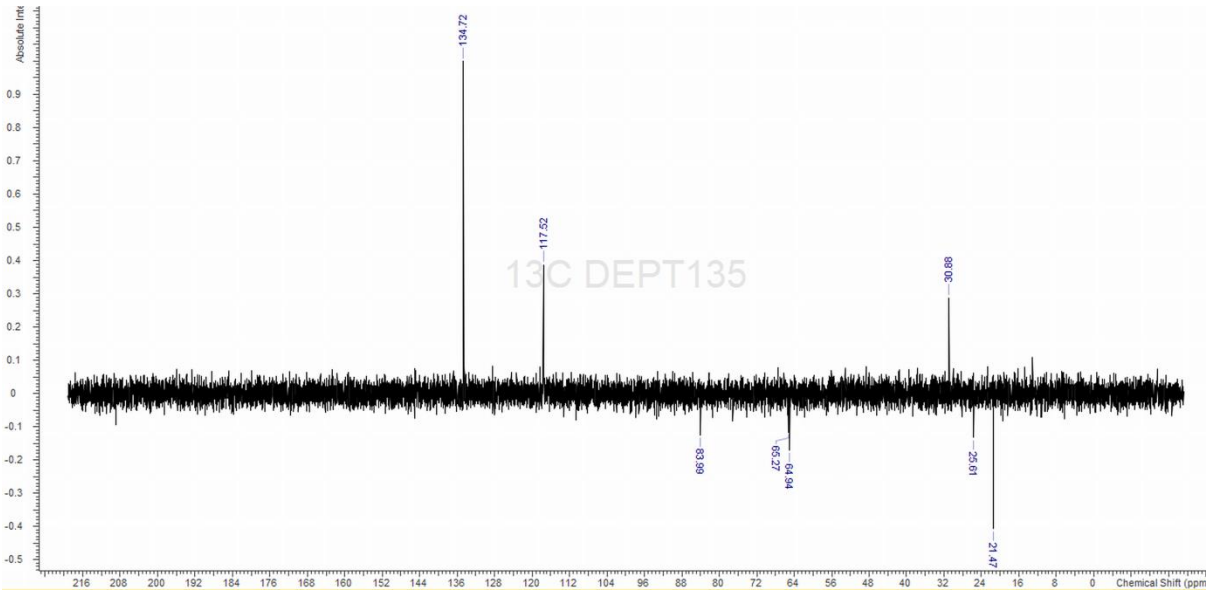

Figure S29: DEPT-135 NMR spectrum ($CDCl_3$, 298 K).

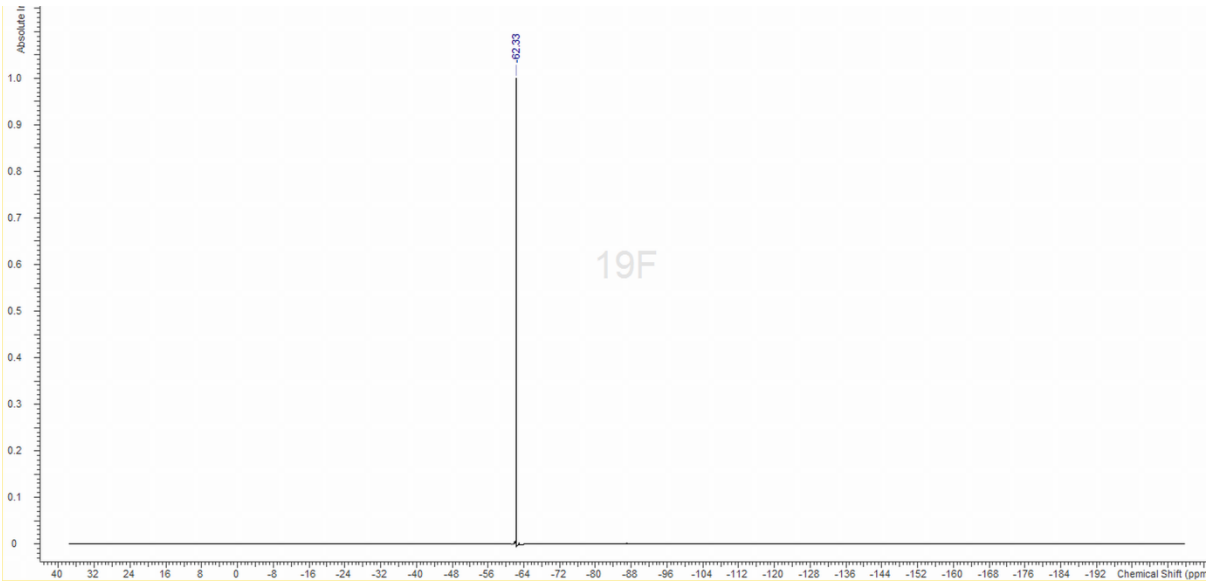

Figure S30: $^{19}F\{^{1}H\}$ NMR spectrum ($CDCl_3$, 298 K).

[EMIM][Al(O^{t}C$_4$F$_9$)$_4$]:

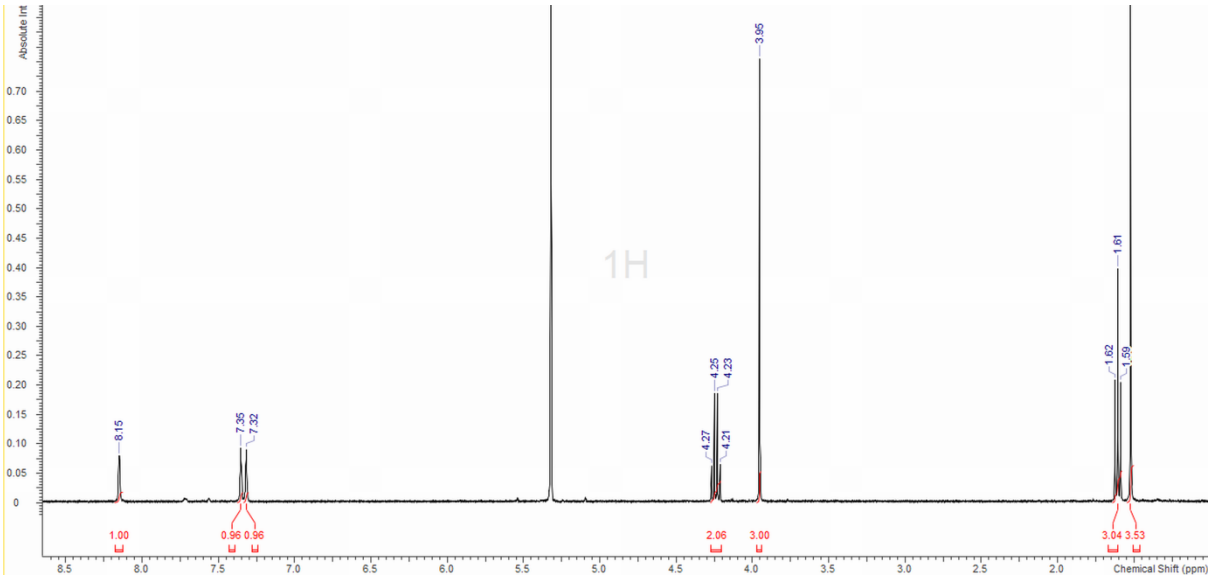

Figure S31: ^{1}H NMR spectrum (CD_2Cl_2, 298 K).

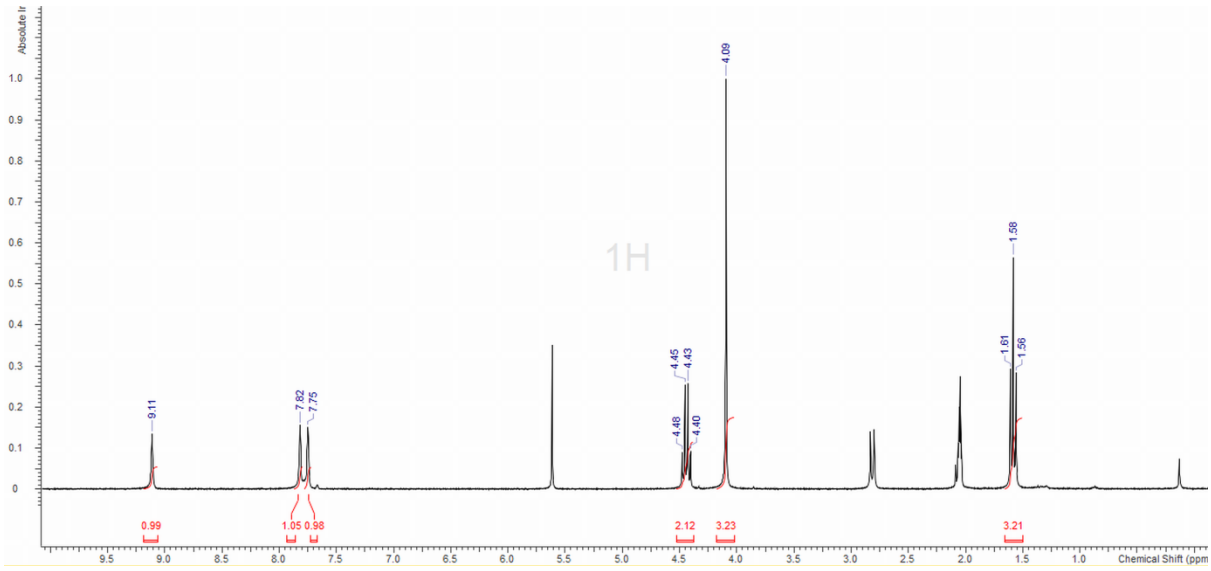

Figure S32: ^{1}H NMR spectrum ($(CD_3)_2CO$, 298 K).

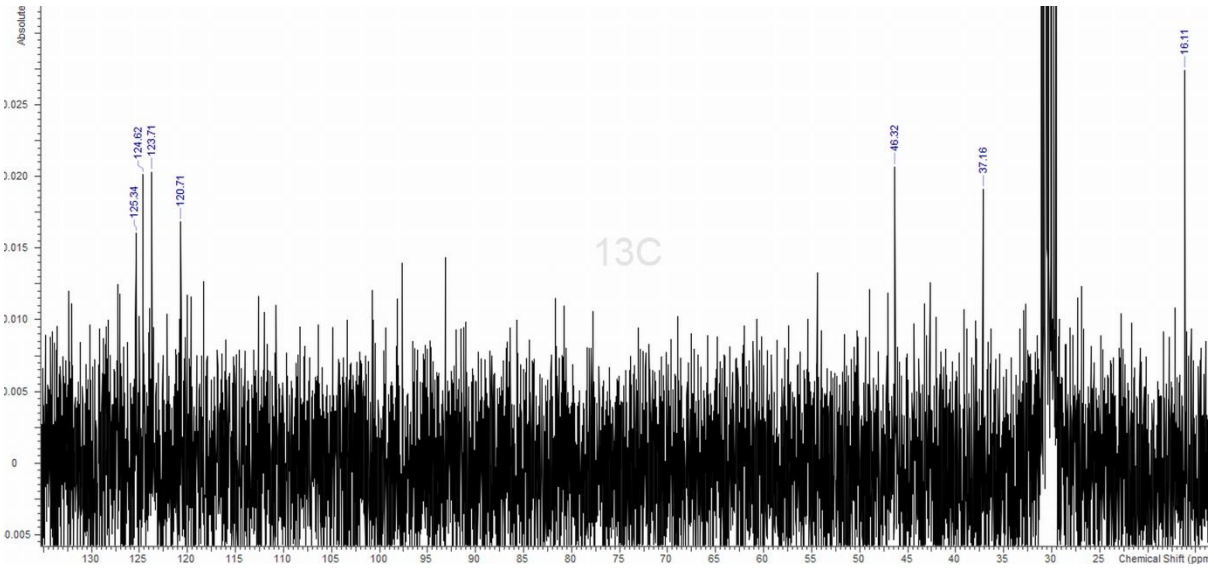

Figure S33: $^{13}C\{^{1}H\}$ NMR spectrum ($(CD_3)_2CO$, 298 K).

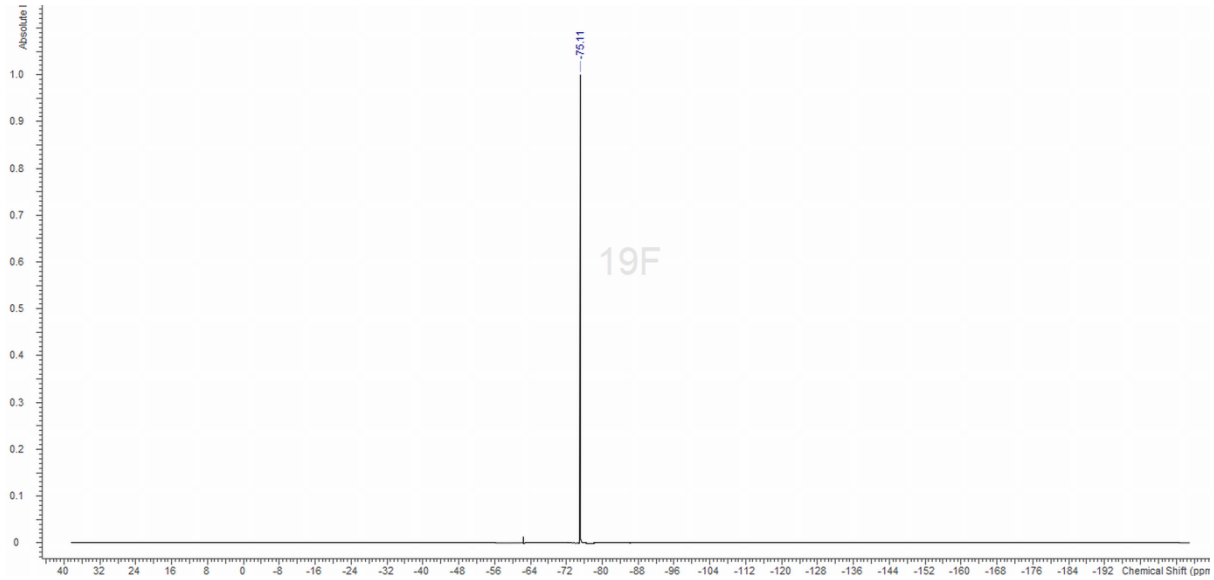

Figure S34: $^{19}F\{^{1}H\}$ NMR spectrum ($(CD_3)_2CO$, 298 K).

[EDMIM][Al(O^{t}C$_4$F$_9$)$_4$]:

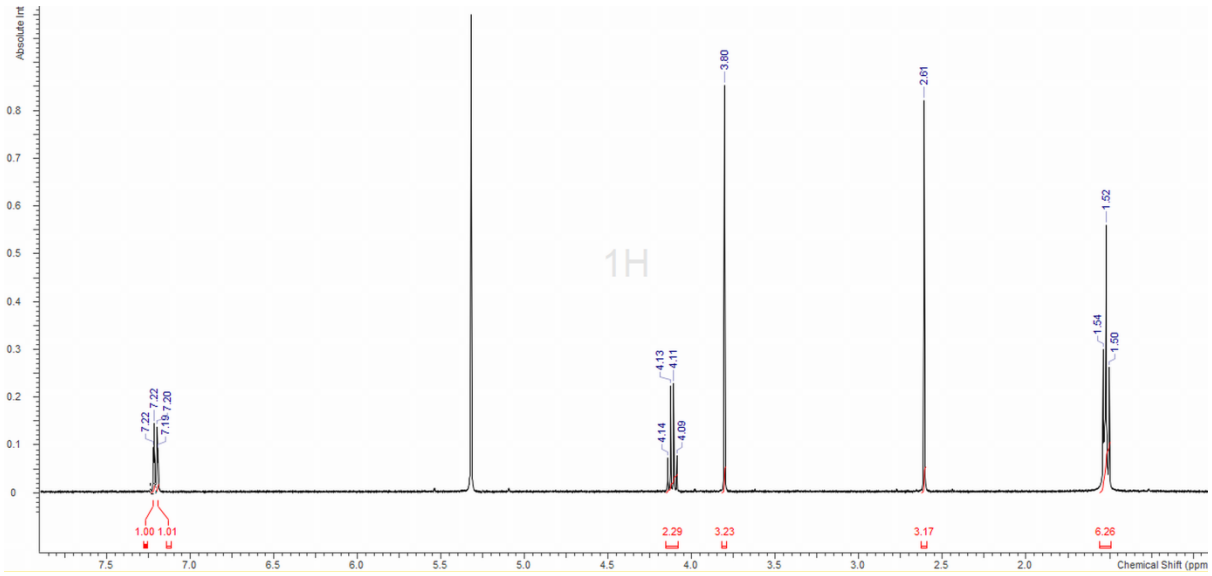

Figure S35: ^{1}H NMR spectrum (CD_2Cl_2, 298 K).

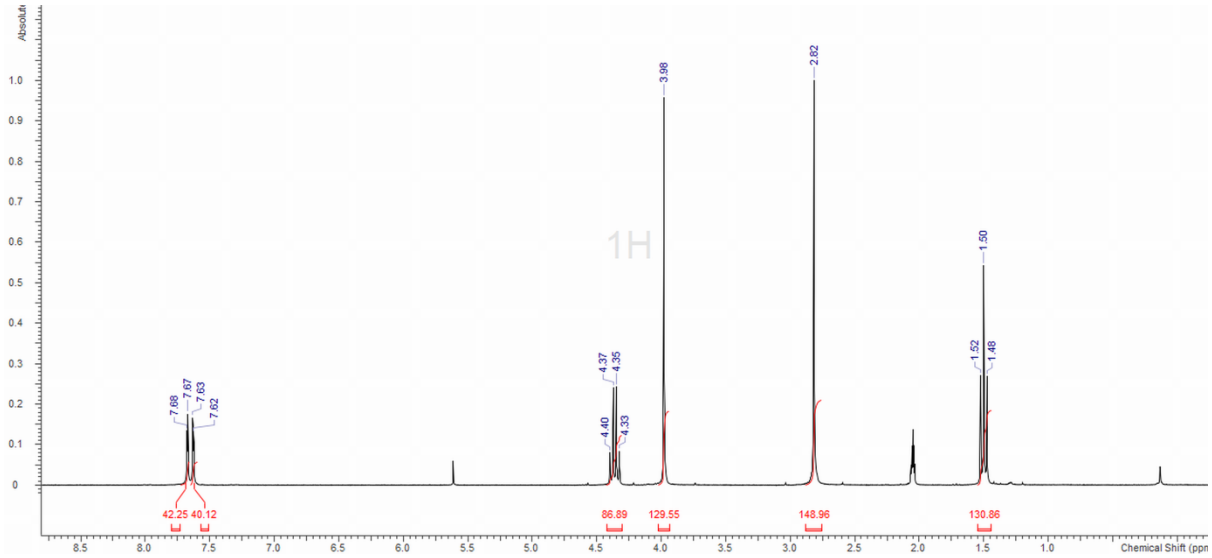

Figure S36: ^{1}H NMR spectrum ($(CD_3)_2CO$, 298 K).

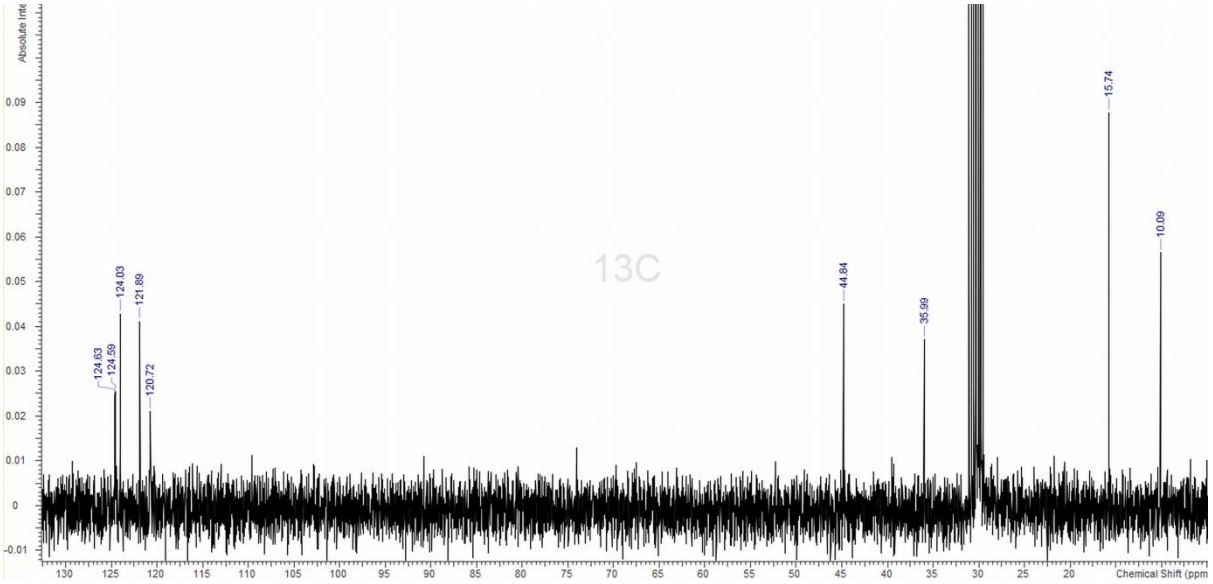

Figure S37: $^{13}C\{^{1}H\}$ NMR spectrum ($(CD_3)_2CO$, 298 K).

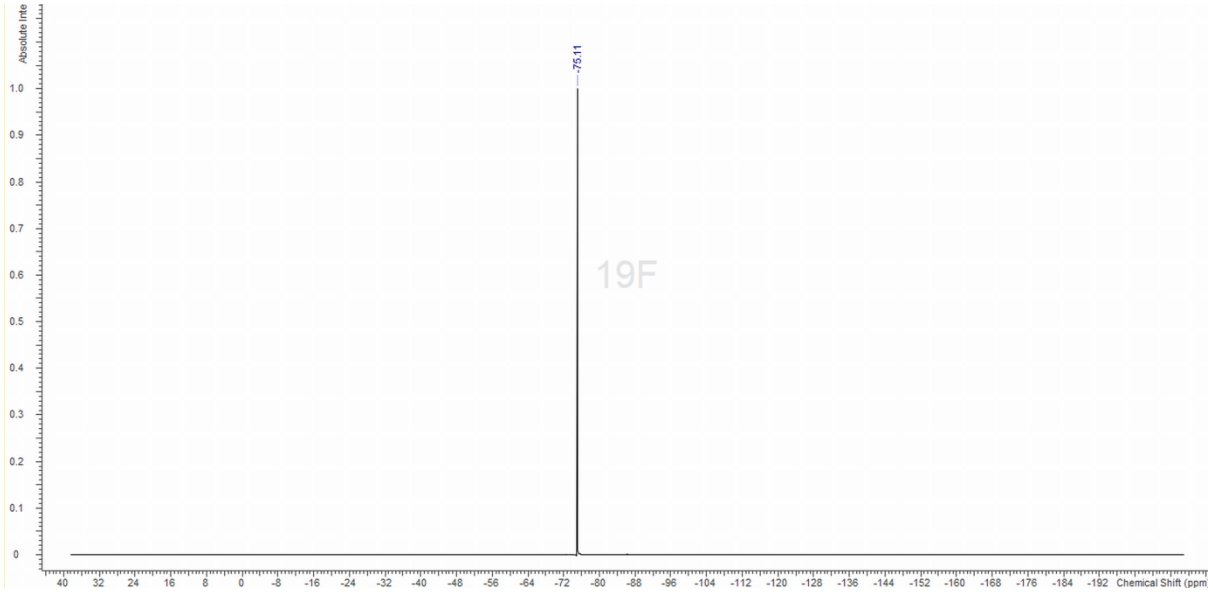

Figure S38: $^{19}F\{^{1}H\}$ NMR spectrum ($(CD_3)_2CO$, 298 K).

[HMIM][Al(O^{t}C$_4$F$_9$)$_4$]:

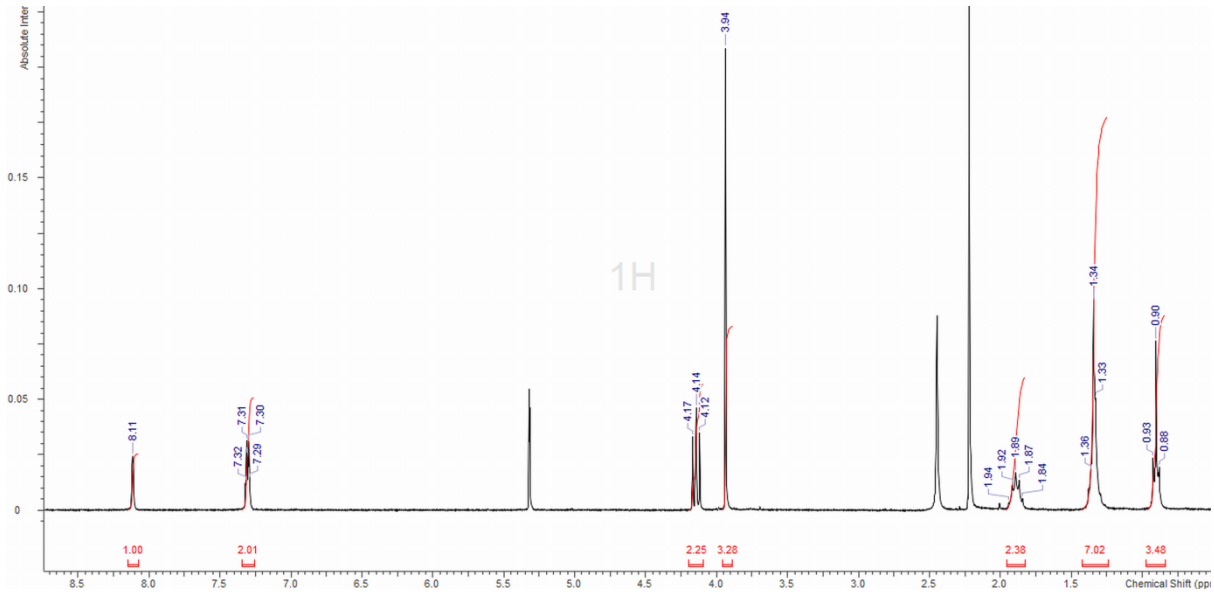

Figure S39: ^{1}H NMR spectrum (CD_2Cl_2, 298 K).

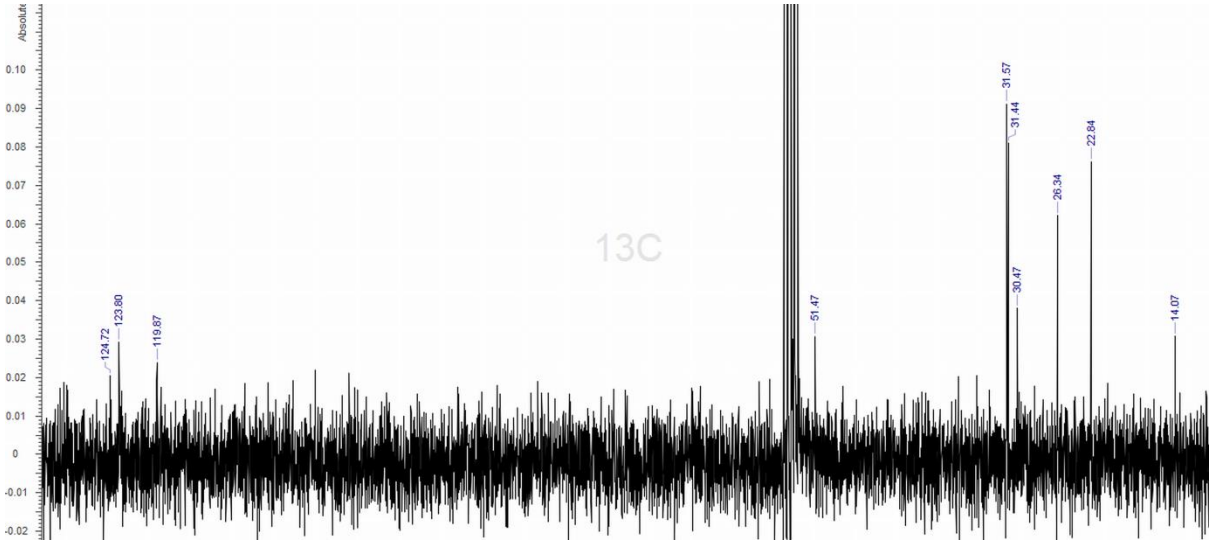

Figure S40: ^{13}C{^{1}H} NMR spectrum (CD_2Cl_2, 298 K).

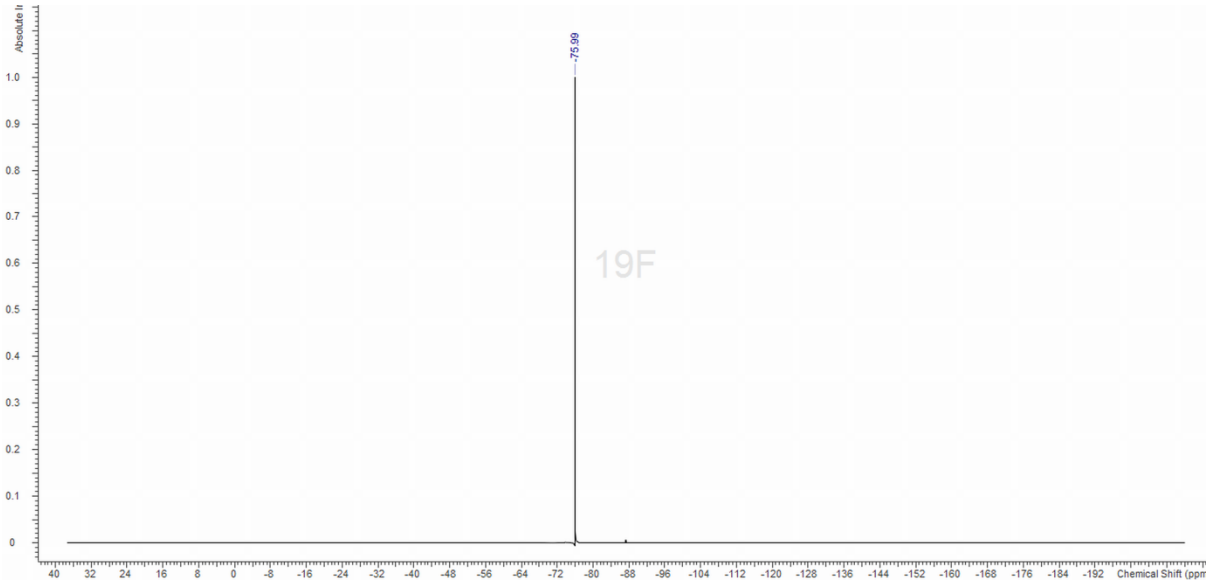

Figure S41: $^{19}F\{^{1}H\}$ NMR spectrum (CD_2Cl_2, 298 K).

[EMBIM][Al(O^{t}C$_4$F$_9$)$_4$]:

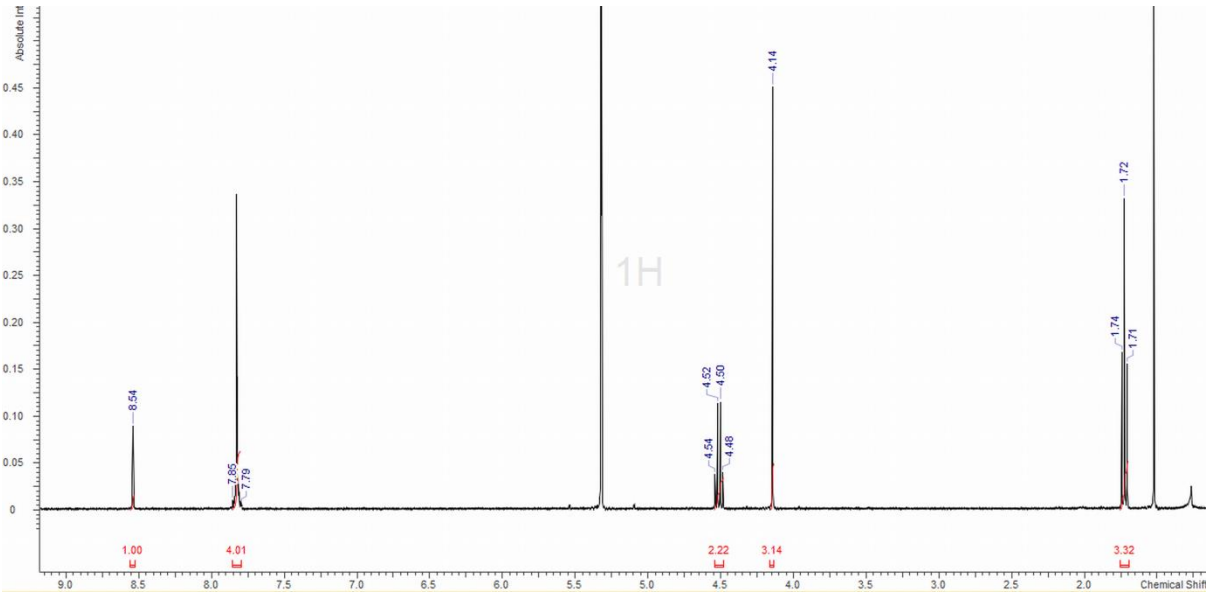

Figure S42: ^{1}H NMR spectrum (CD_2Cl_2, 298 K).

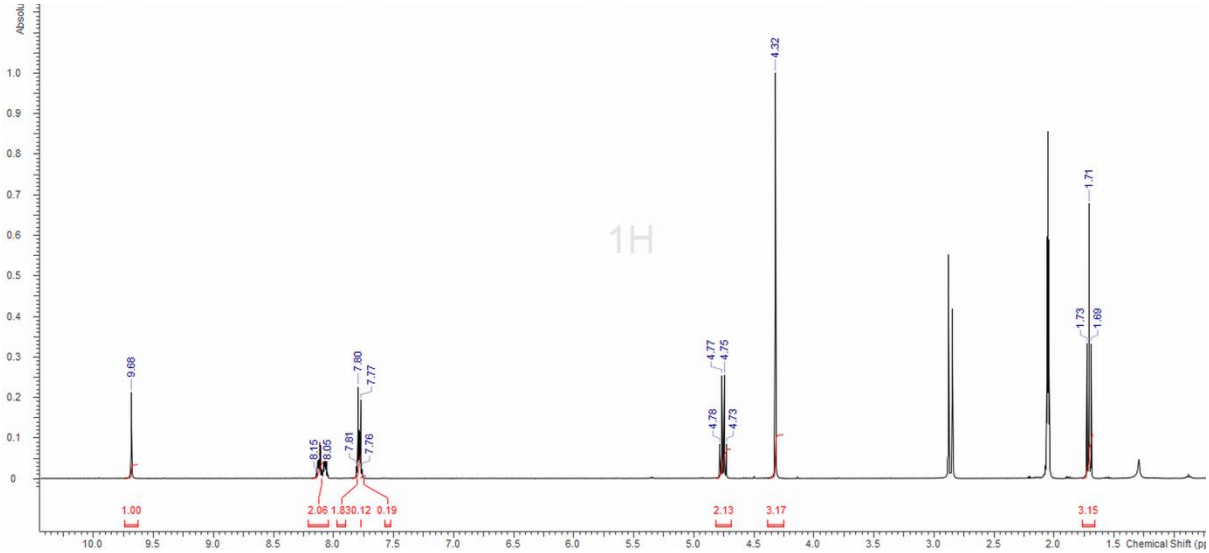

Figure S43: ^{1}H NMR spectrum ($(CD_3)_2CO$, 298 K).

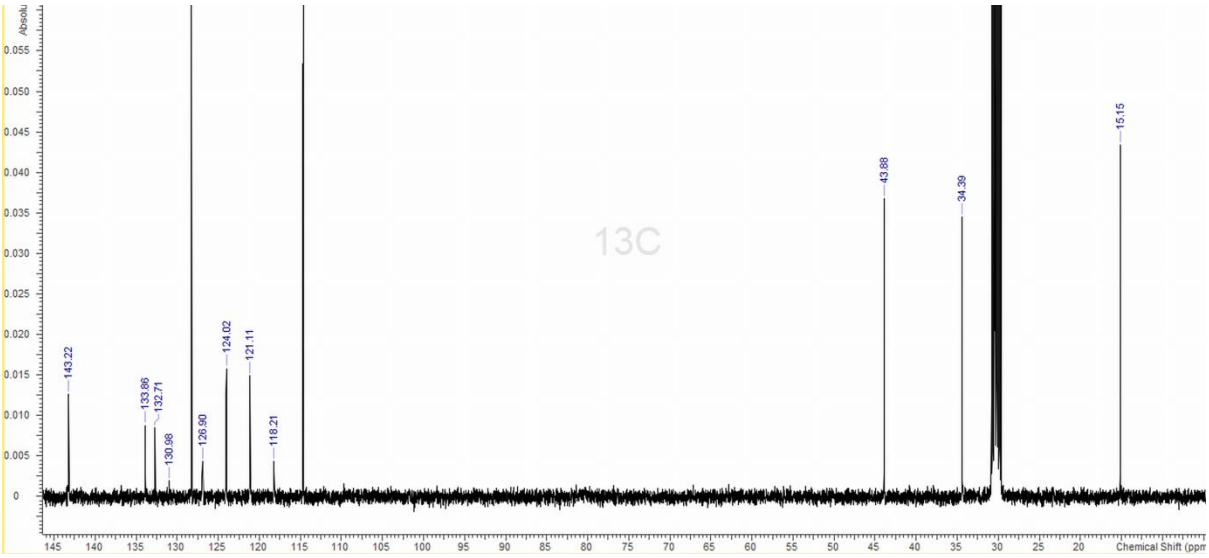

Figure S44: $^{13}C\{^{1}H\}$ NMR spectrum ($(CD_3)_2CO$, 298 K).

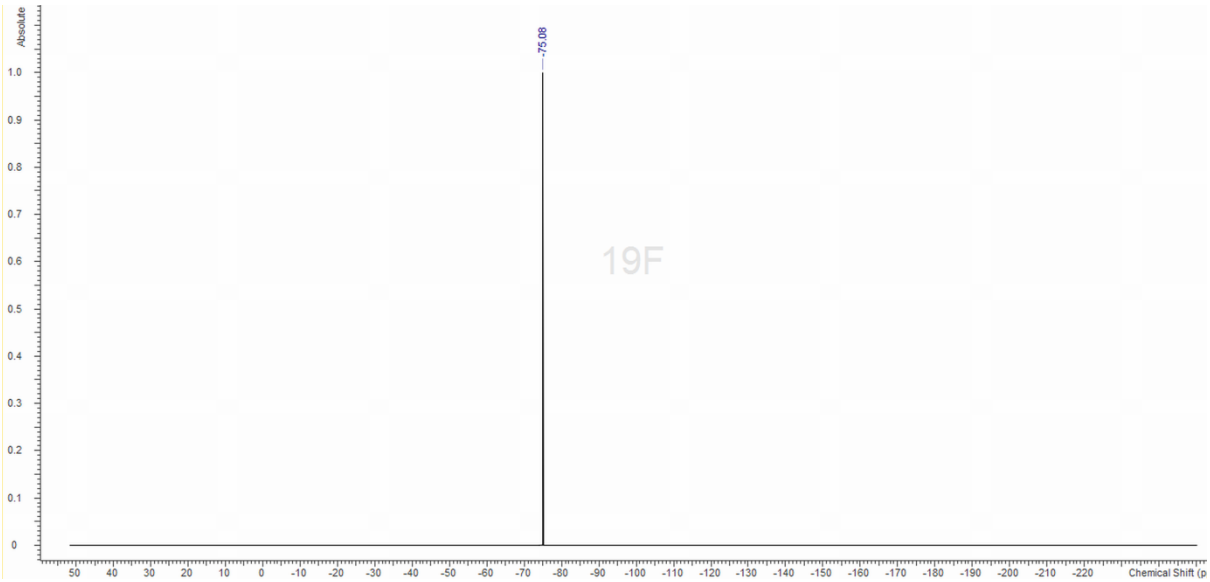

Figure S45: $^{19}F\{^{1}H\}$ NMR spectrum ($(CD_3)_2CO$, 298 K).