

High Vacuum Distillation of Ionic Liquids and Separation of Ionic Liquid Mixtures

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Supporting Information

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Video of $[\text{C}_8\text{C}_1\text{Im}][\text{Tf}_2\text{N}]$ refluxing in diffusion pump apparatus.

^1H , ^{13}C and ^{19}F NMRs of $[\text{C}_8\text{C}_1\text{Im}][\text{Tf}_2\text{N}]$ after reflux at UHV.

^1H , ^{13}C and ^{19}F NMRs of $[\text{C}_2\text{C}_1\text{Im}][\text{Tf}_2\text{N}]$ starting material and distillate.

Ion Chromatograph of $[\text{C}_2\text{C}_1\text{Im}][\text{Tf}_2\text{N}]$ distillate.

^1H , ^{13}C and ^{19}F NMRs of $[\text{C}_8\text{C}_1\text{Im}][\text{Tf}_2\text{N}]$ starting material and distillate.

Ion Chromatograph of $[\text{C}_8\text{C}_1\text{Im}][\text{Tf}_2\text{N}]$ distillate.

^1H NMRs of alkyl chain region of Fractions 1, 2 and 3 from fractional distillation of $\text{CC}'\text{A}_2$ mixture = $[\text{C}_2\text{C}_1\text{Im}][\text{C}_8\text{C}_1\text{Im}][\text{Tf}_2\text{N}]_2$.

^1H NMRs of alkyl chain region of starting mixture, residue and distillate from distillation of $\text{CC}'\text{AA}'$ mixture = $[\text{C}_2\text{C}_1\text{Im}][\text{C}_8\text{C}_1\text{Im}][\text{Tf}_2\text{N}][\text{EtOSO}_3]$.

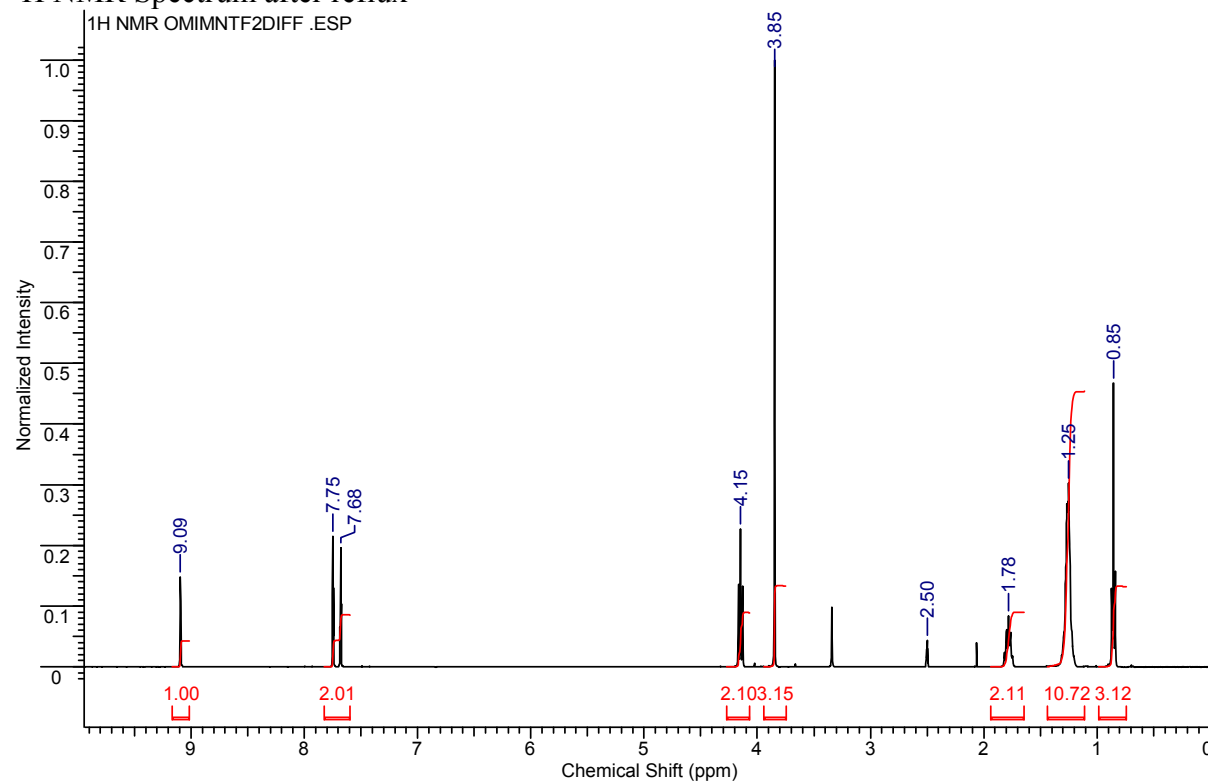
Ion Chromatographs of starting mixture and residue of $\text{CC}'\text{AA}'$ mixture = $[\text{C}_2\text{C}_1\text{Im}][\text{C}_8\text{C}_1\text{Im}][\text{Tf}_2\text{N}][\text{EtOSO}_3]$.

Video of [C₈C₁Im][Tf₂N] refluxing in diffusion pump apparatus.

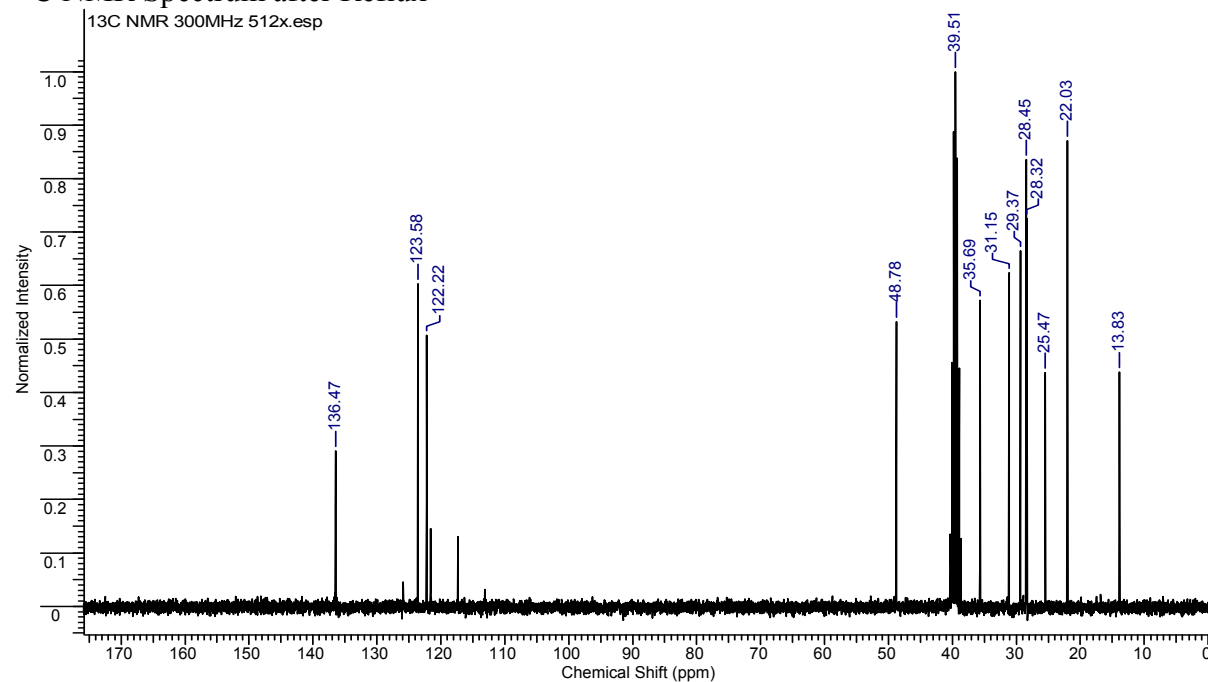
See separate file PIC_0003.AVI

¹H, ¹³C and ¹⁹F NMRs of [C₈C₁Im][Tf₂N] after reflux at UHV.

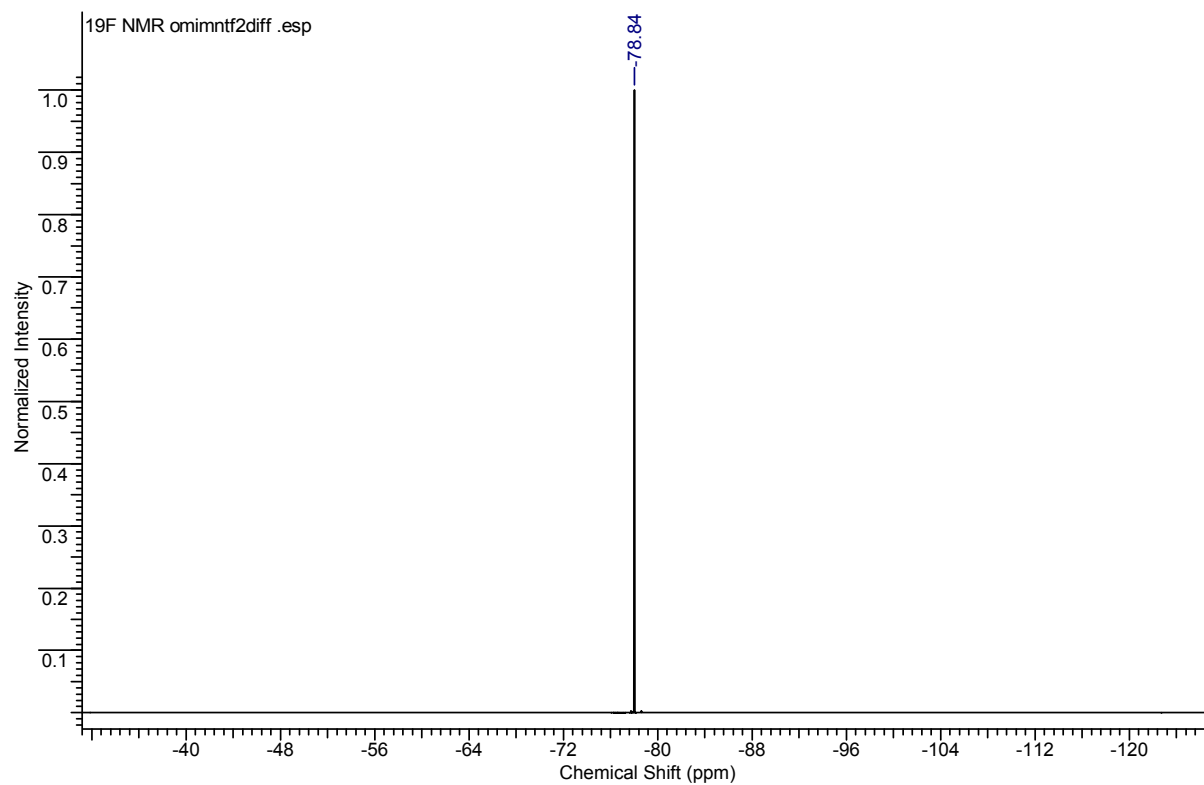
¹H NMR Spectrum after reflux



¹³C NMR Spectrum after Reflux

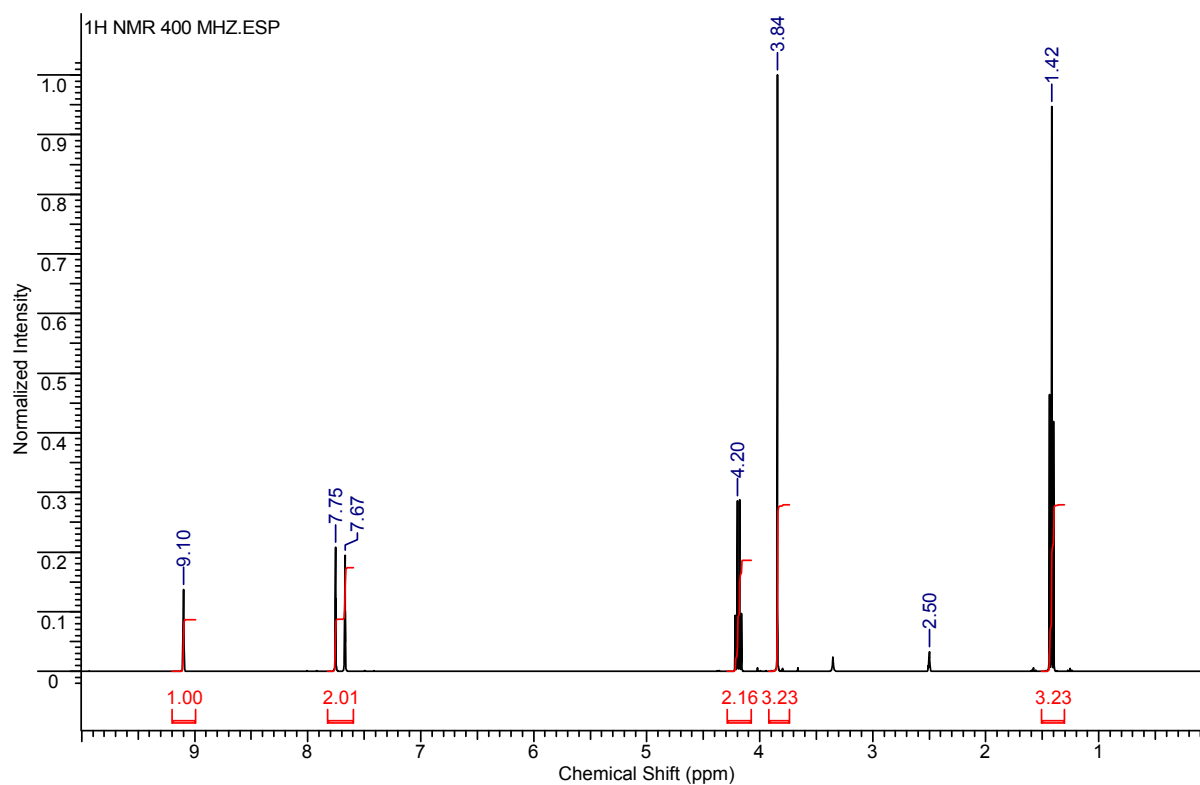


¹⁹F NMR Spectrum after Reflux

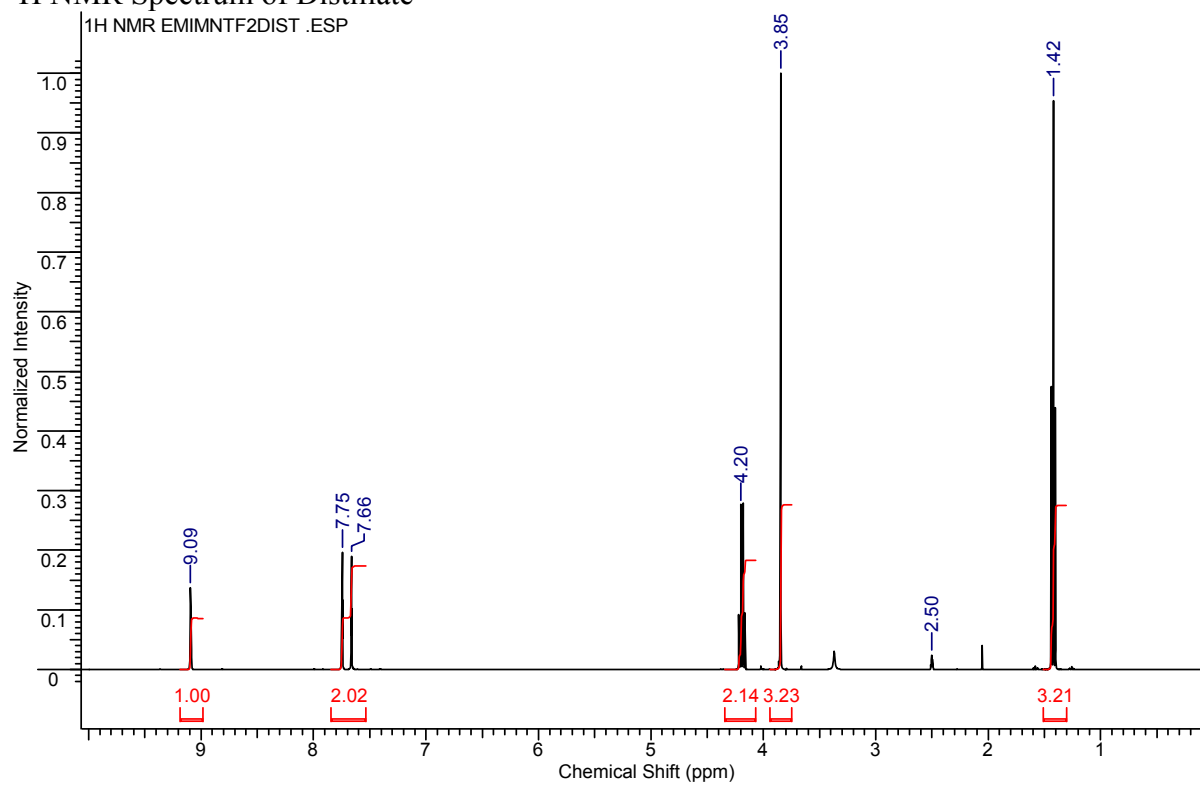


^1H , ^{13}C and ^{19}F NMRs of $[\text{C}_2\text{C}_1\text{Im}][\text{Tf}_2\text{N}]$ starting material and distillate.

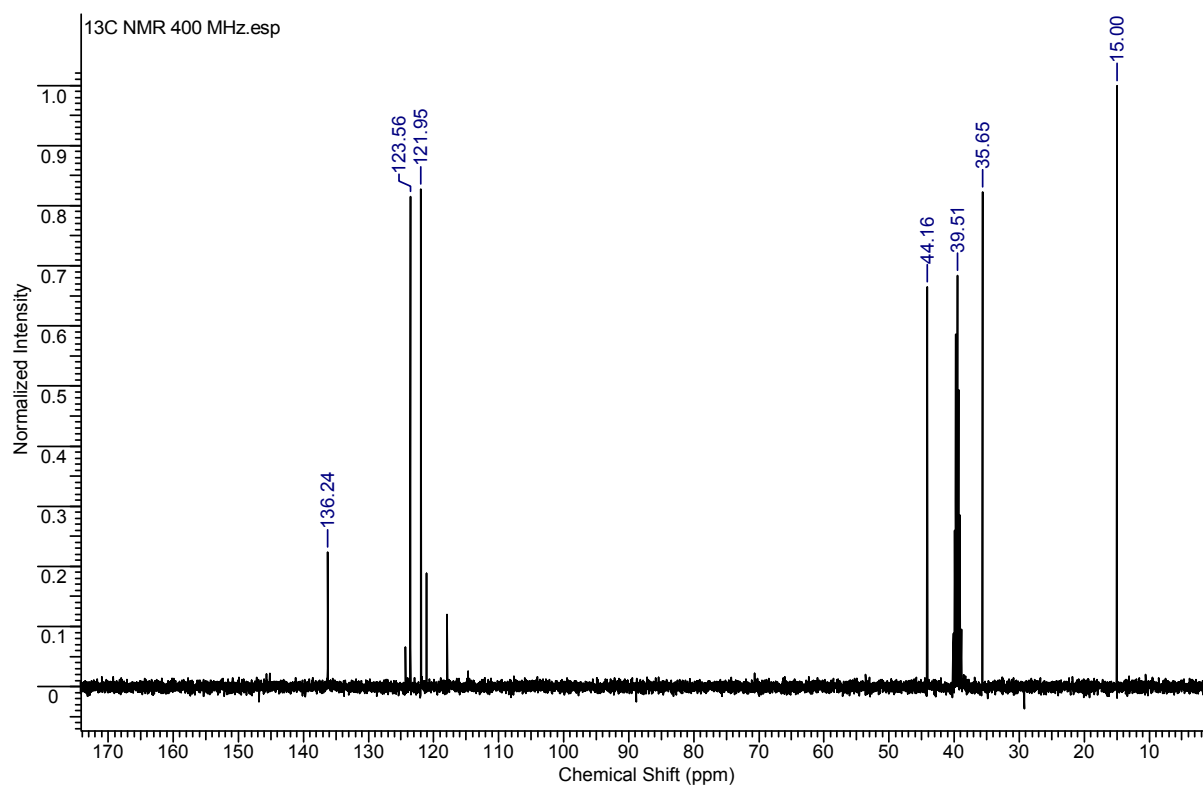
^1H NMR Spectrum of Starting IL



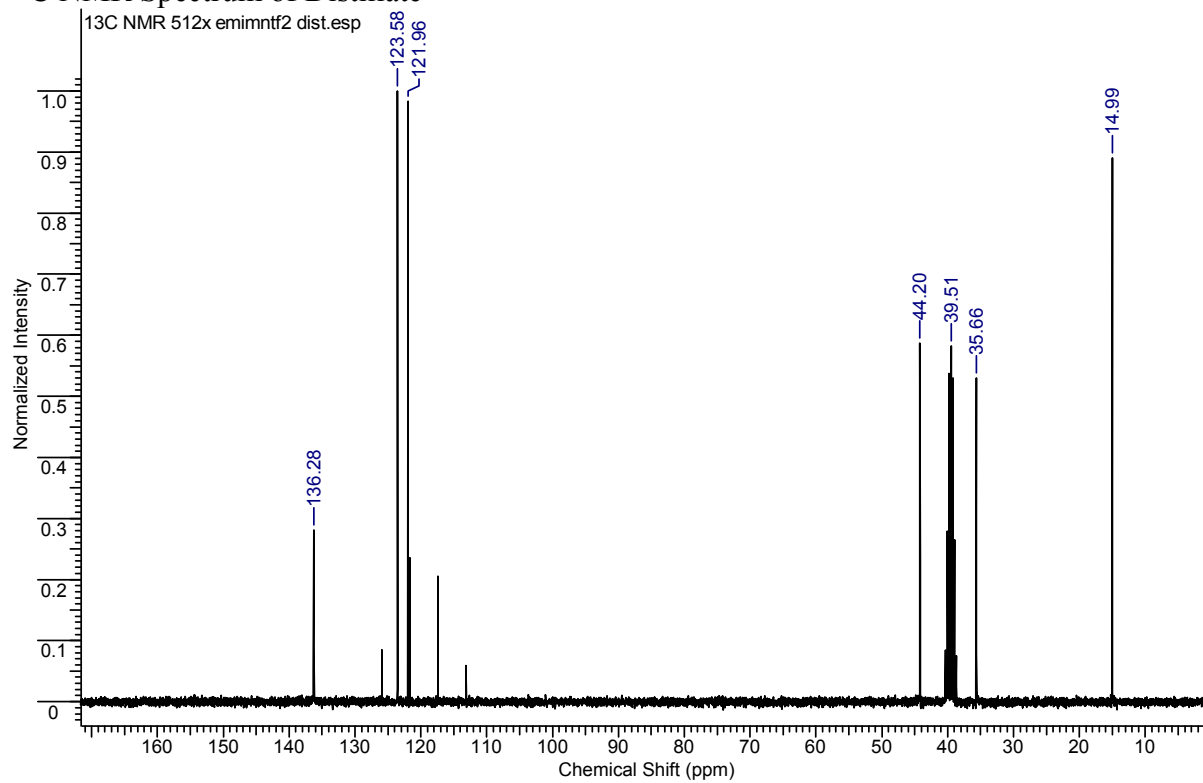
^1H NMR Spectrum of Distillate



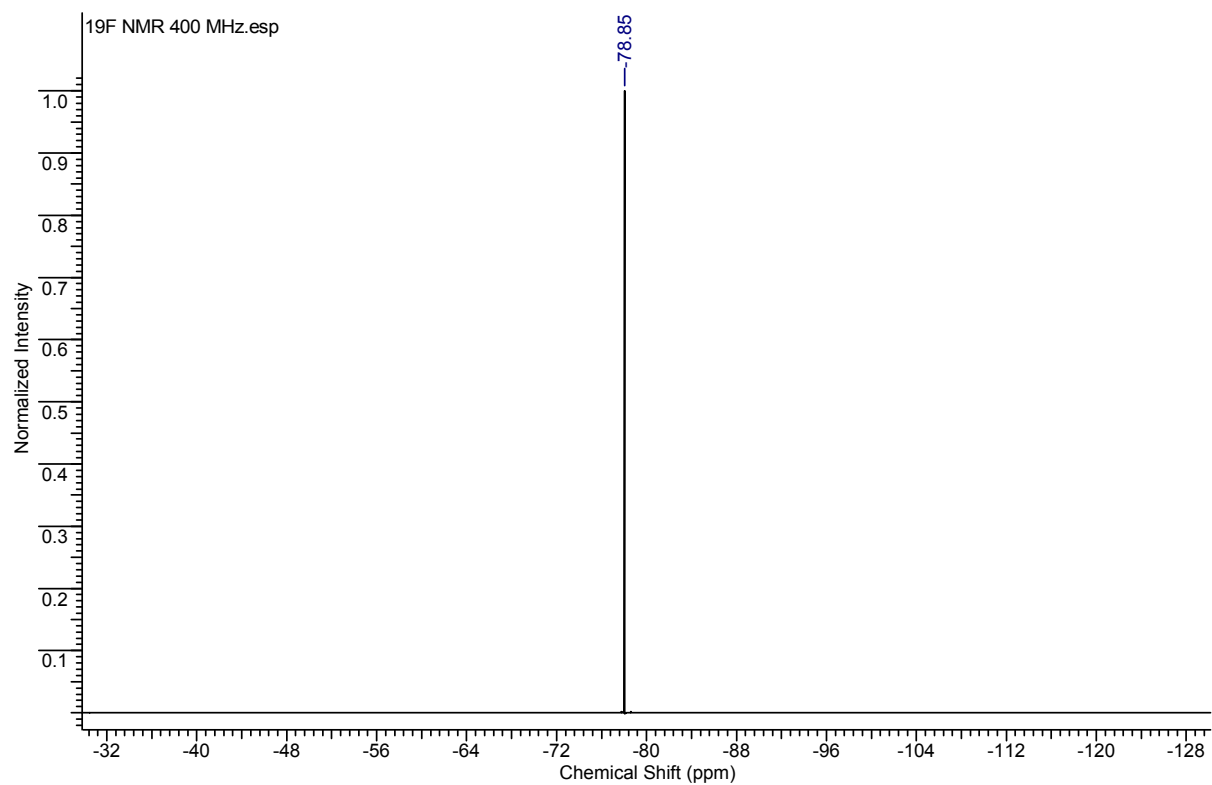
^{13}C NMR Spectrum of Starting IL



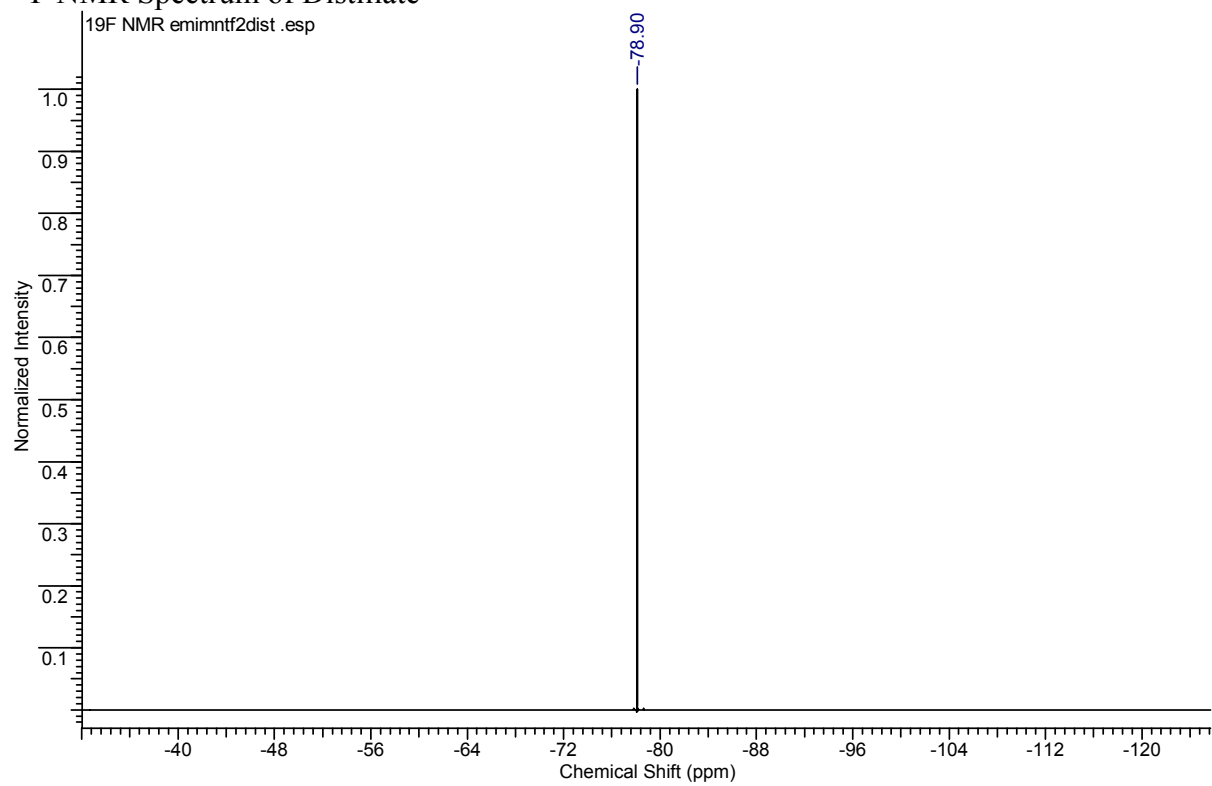
^{13}C NMR Spectrum of Distillate



^{19}F NMR Spectrum of Starting IL

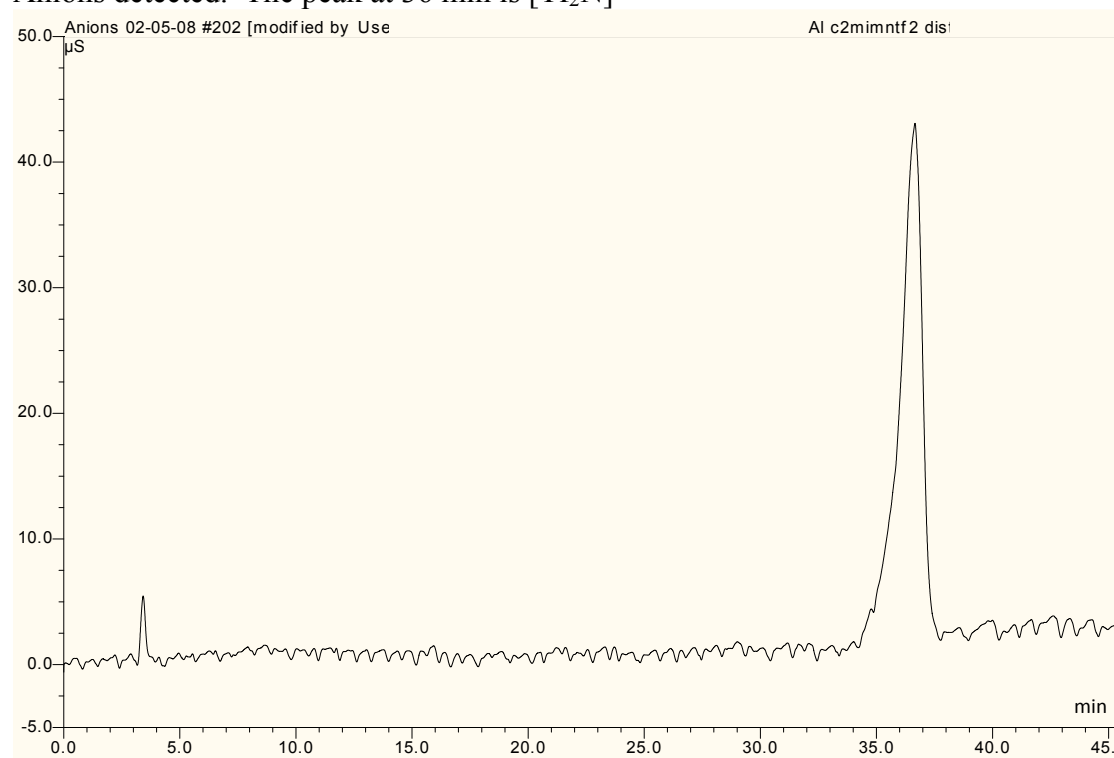


^{19}F NMR Spectrum of Distillate



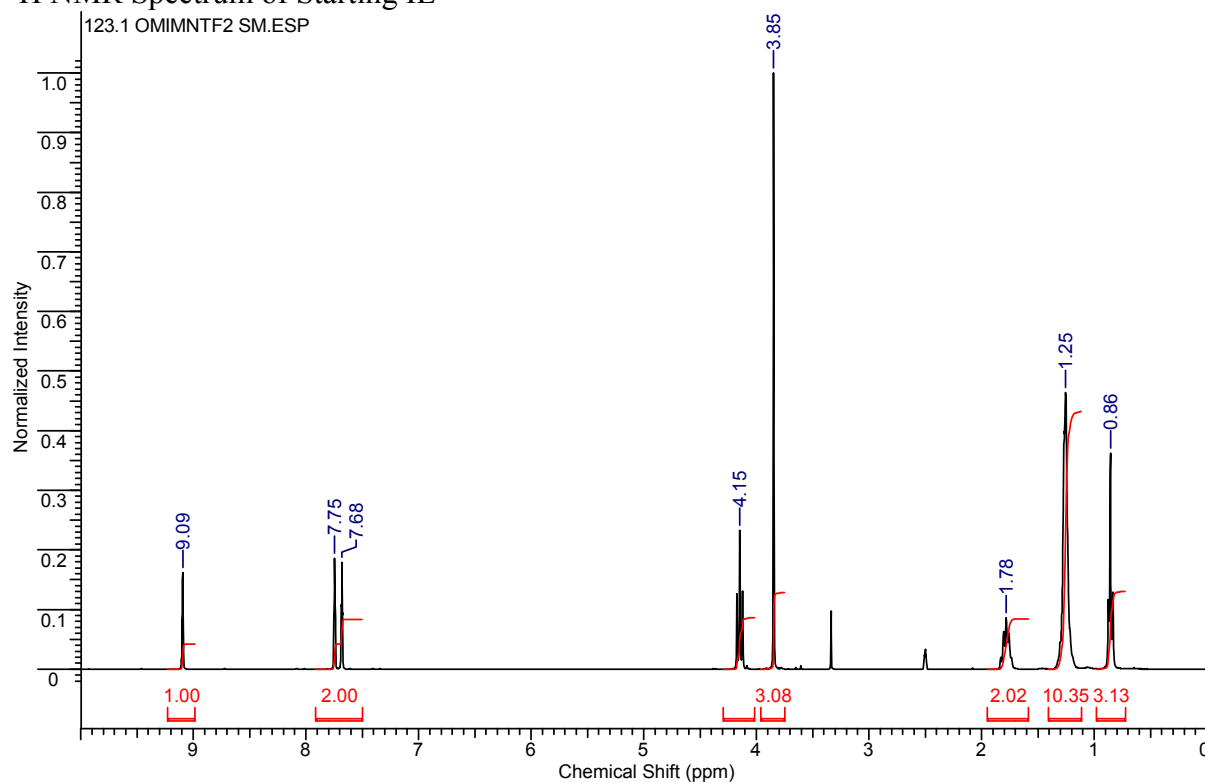
Ion Chromatograph of [C₂C₁Im][Tf₂N] distillate.

Anions detected. The peak at 36 min is [Tf₂N]⁻

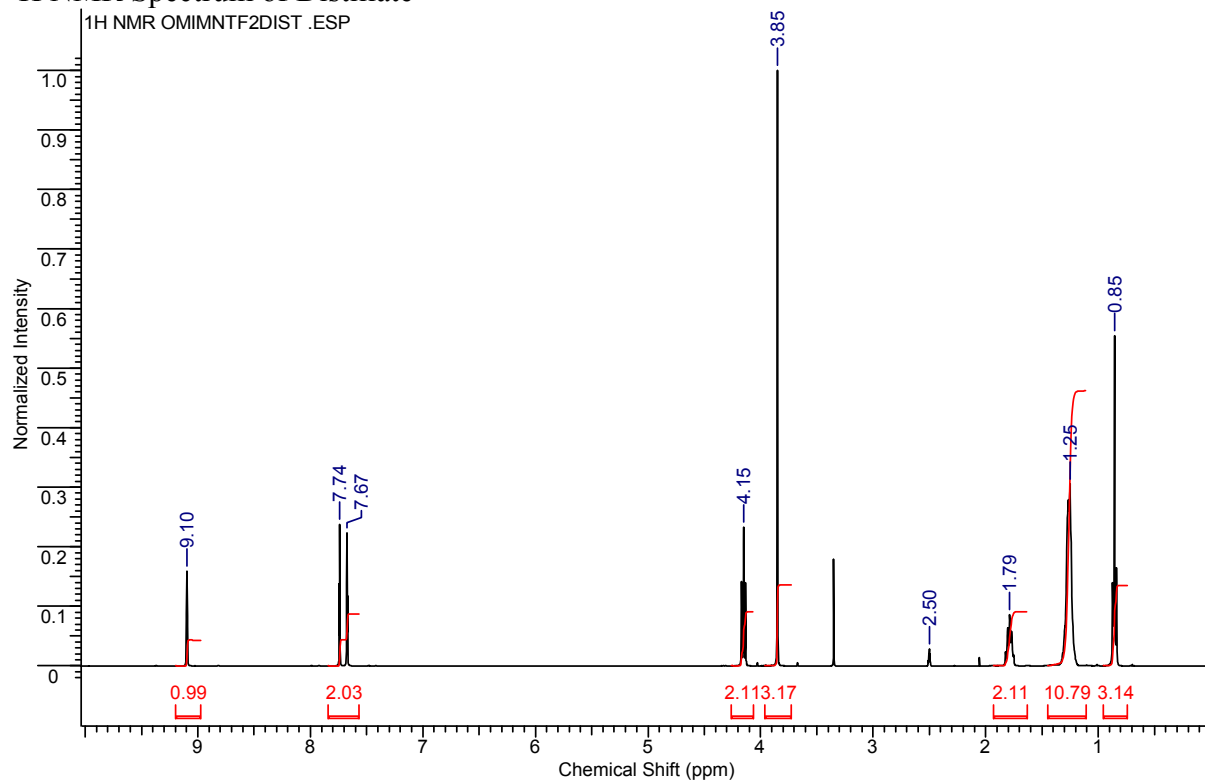


^1H , ^{13}C and ^{19}F NMRs of $[\text{C}_8\text{C}_1\text{Im}][\text{Tf}_2\text{N}]$ starting material and distillate.

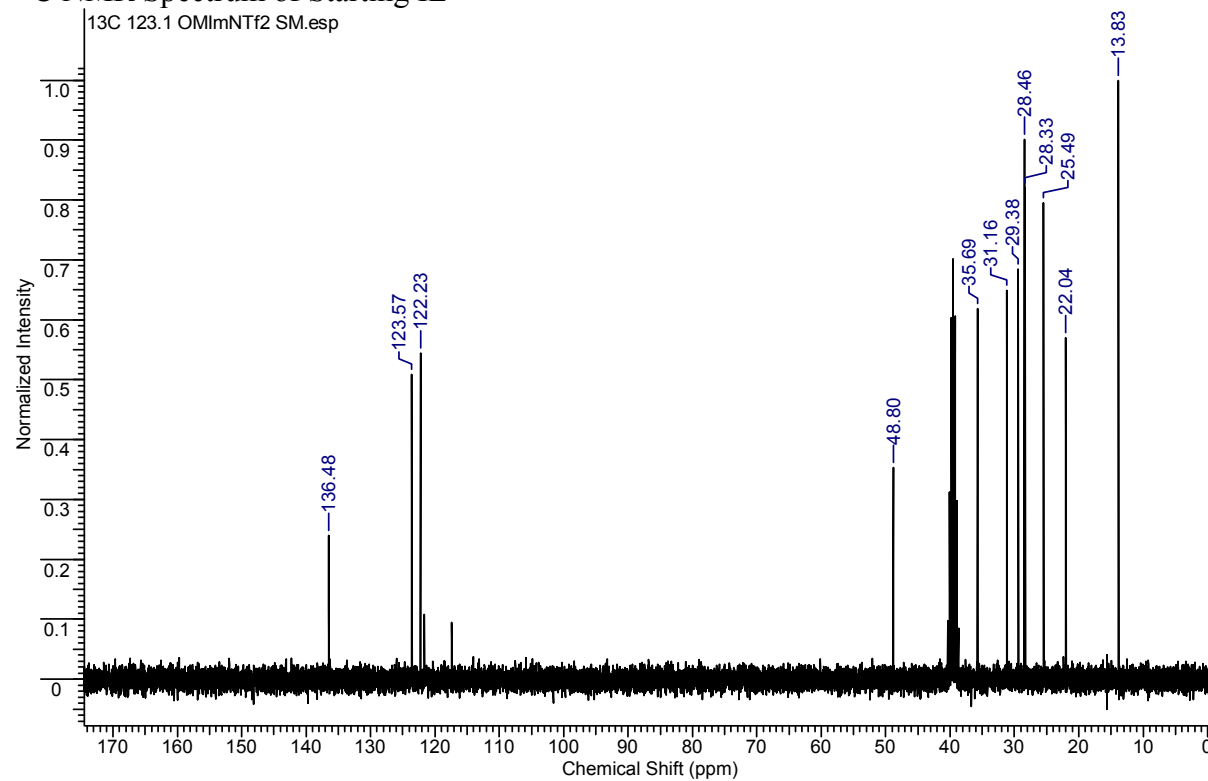
^1H NMR Spectrum of Starting IL



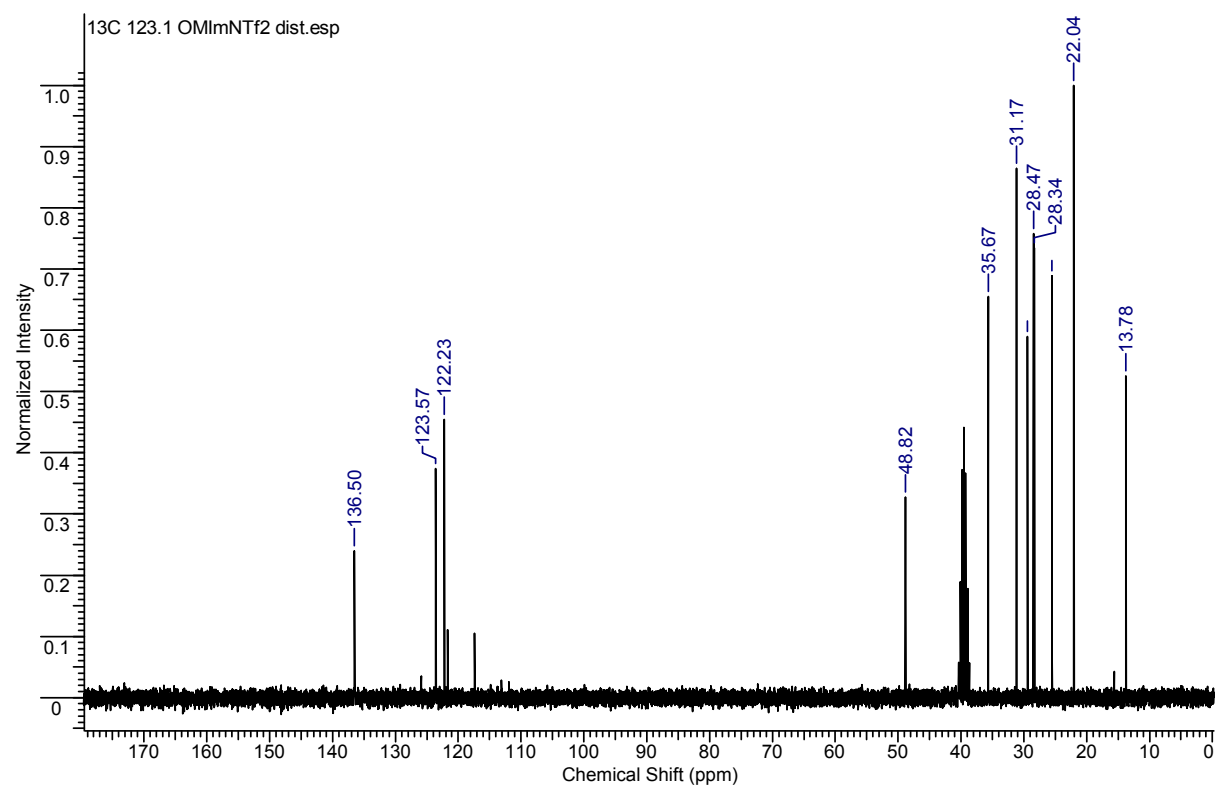
^1H NMR Spectrum of Distillate



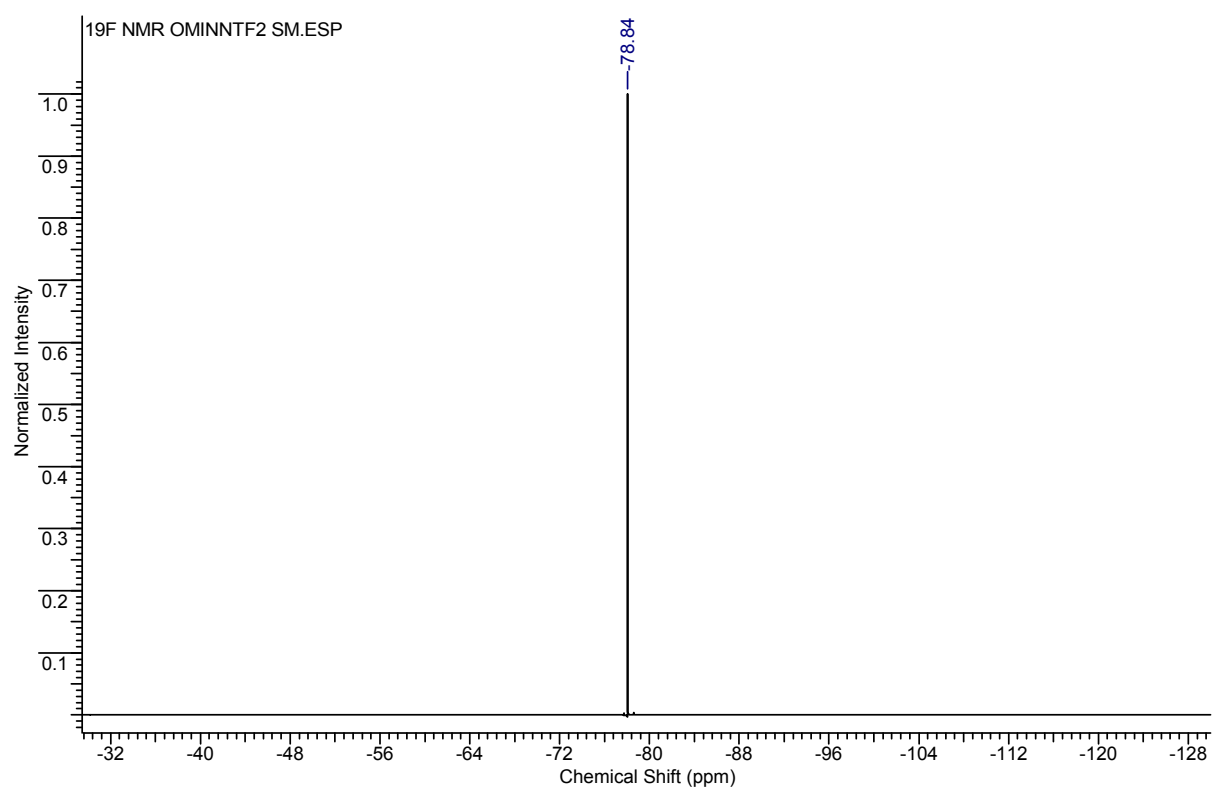
^{13}C NMR Spectrum of Starting IL



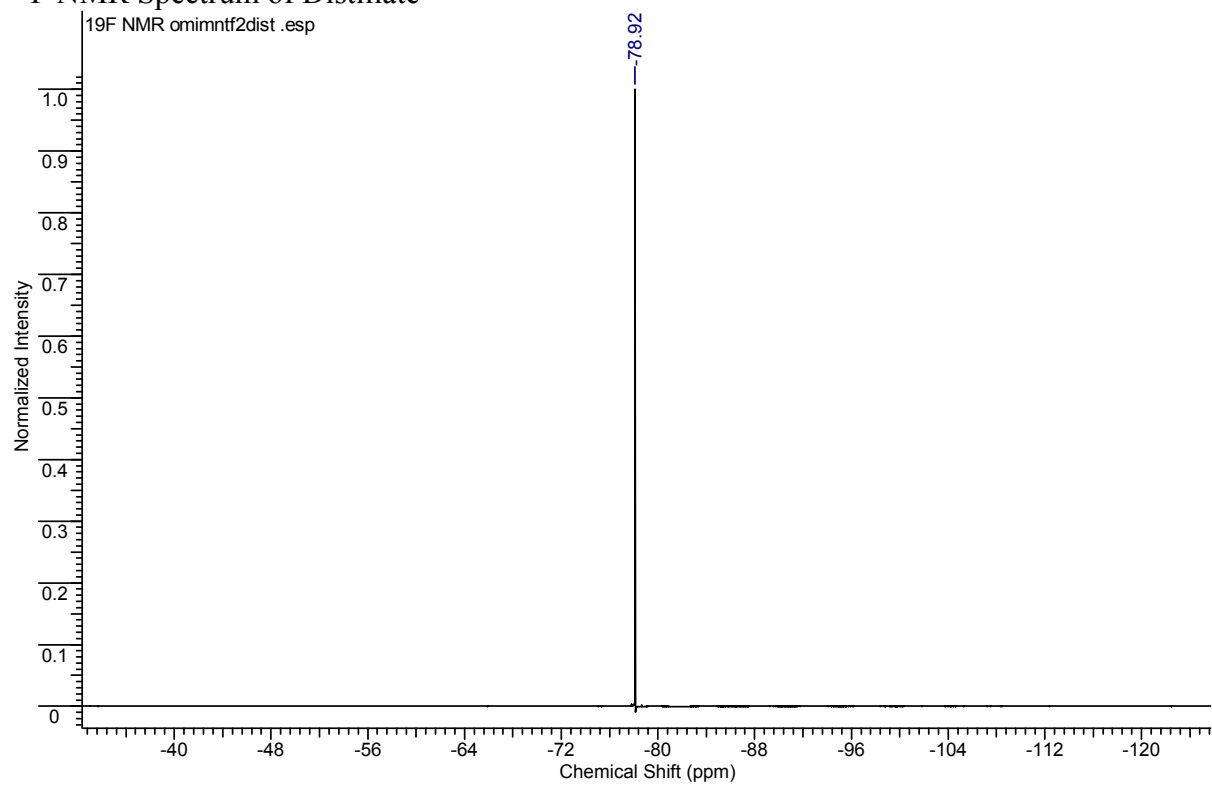
^{13}C NMR Spectrum of Distillate



^{19}F NMR Spectrum of Starting IL

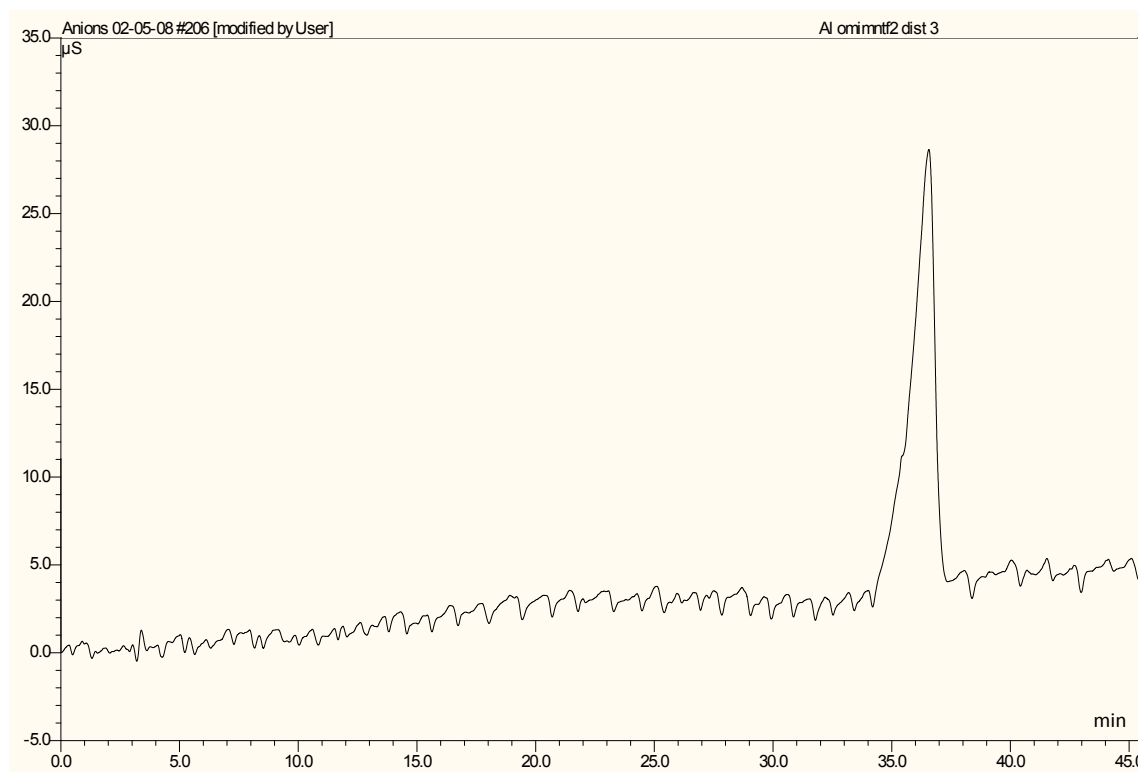


^{19}F NMR Spectrum of Distillate



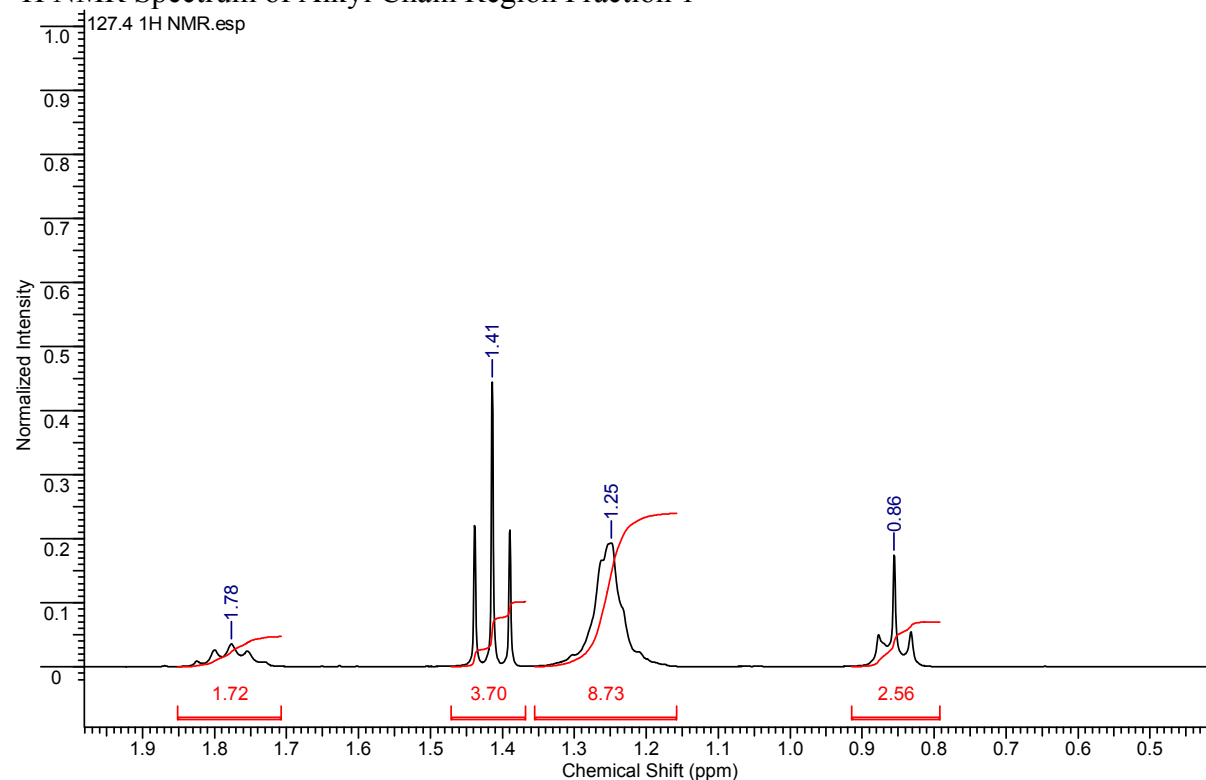
Ion Chromatograph of [C₈C₁Im][Tf₂N] distillate.

Anions detected. The peak at 36 min is [Tf₂N]⁻

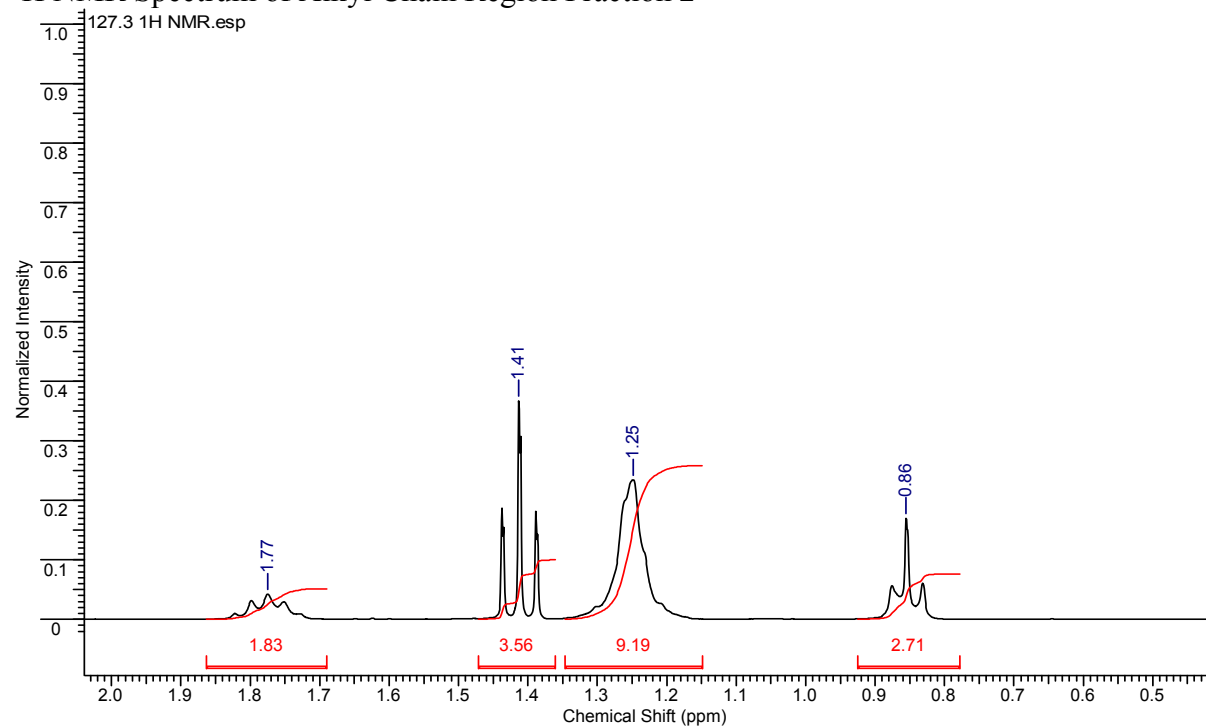


^1H NMRs of alkyl chain region of Fractions 1, 2 and 3 from fractional distillation of CC'A₂ mixture = [C₂C₁Im][C₈C₁Im][Tf₂N]₂.

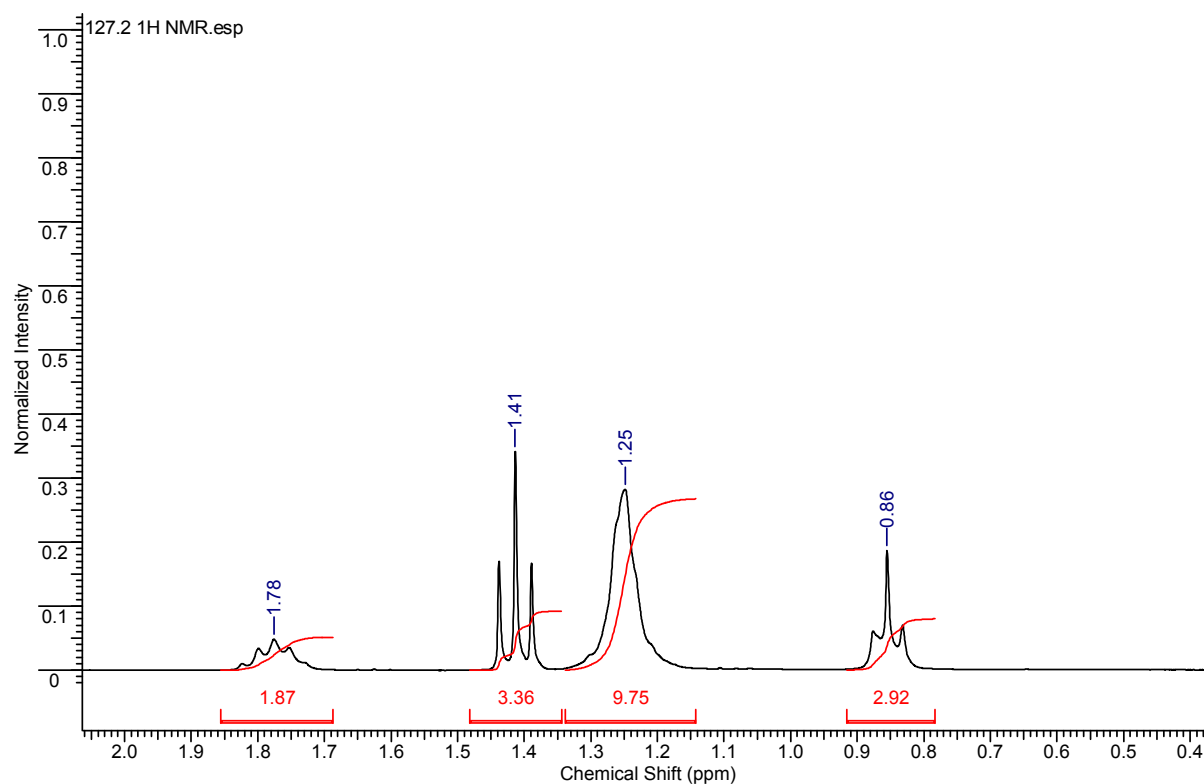
^1H NMR Spectrum of Alkyl Chain Region Fraction 1



^1H NMR Spectrum of Alkyl Chain Region Fraction 2

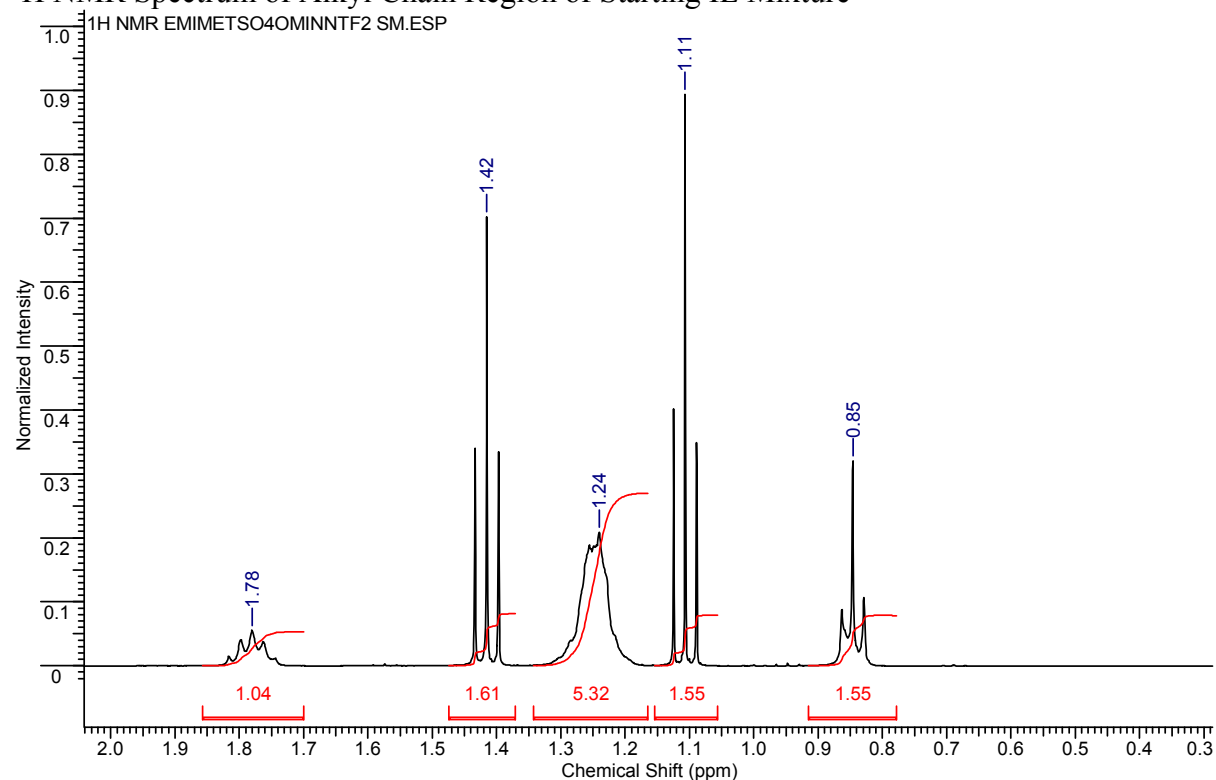


^1H NMR Spectrum of Alkyl Chain Region Fraction 3

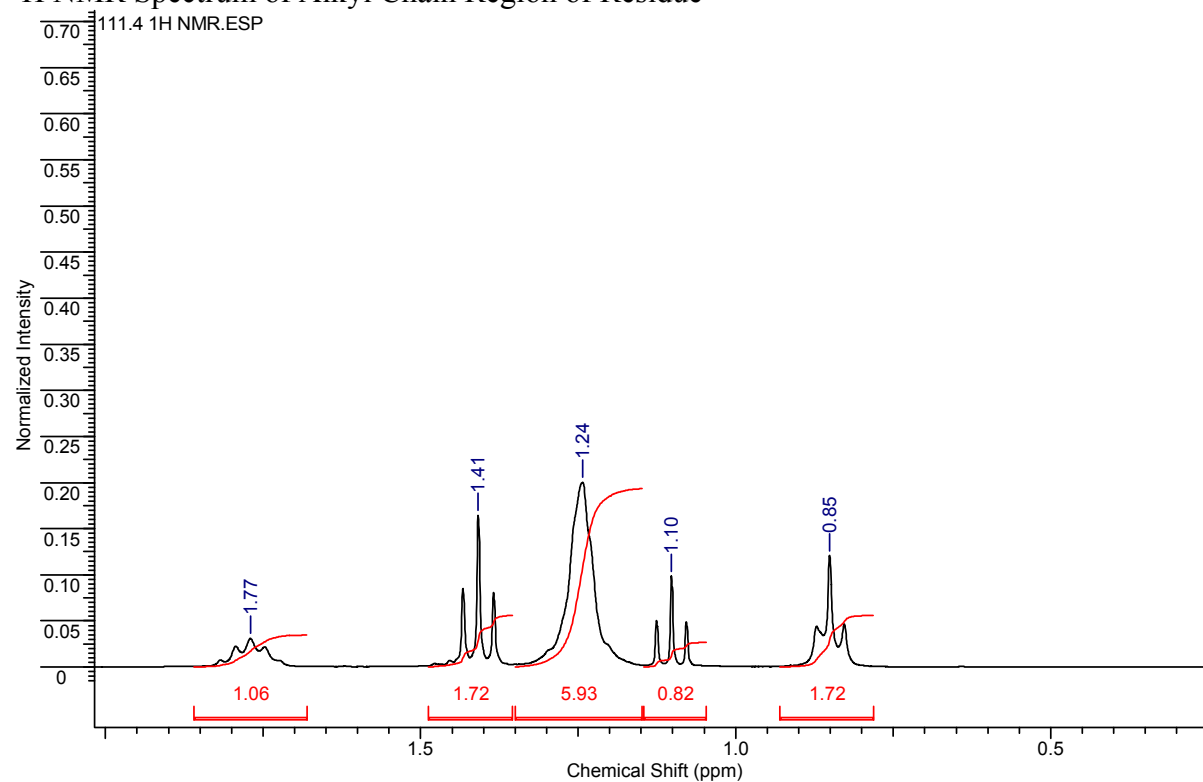


^1H NMRs of alkyl chain region of starting mixture, residue and distillate from distillation of CC'AA' mixture = $[\text{C}_2\text{C}_1\text{Im}][\text{C}_8\text{C}_1\text{Im}][\text{Tf}_2\text{N}][\text{EtOSO}_3]$.

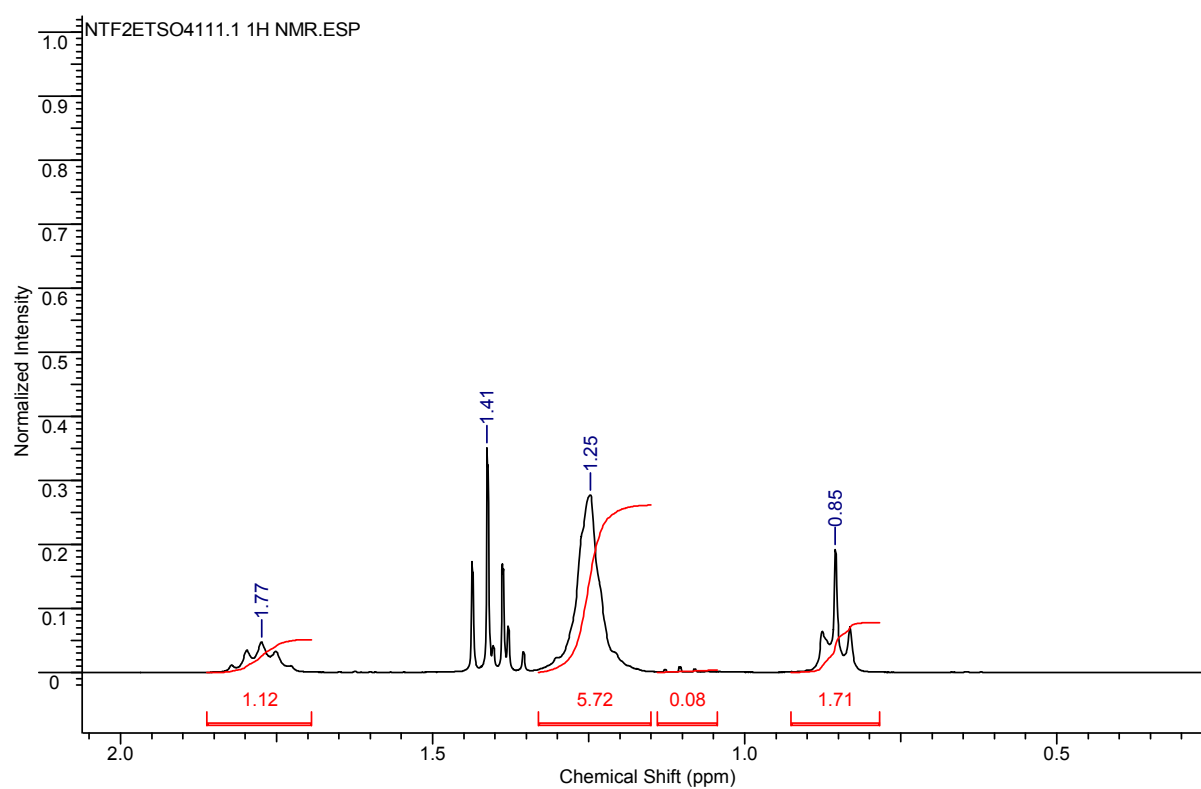
^1H NMR Spectrum of Alkyl Chain Region of Starting IL Mixture



^1H NMR Spectrum of Alkyl Chain Region of Residue



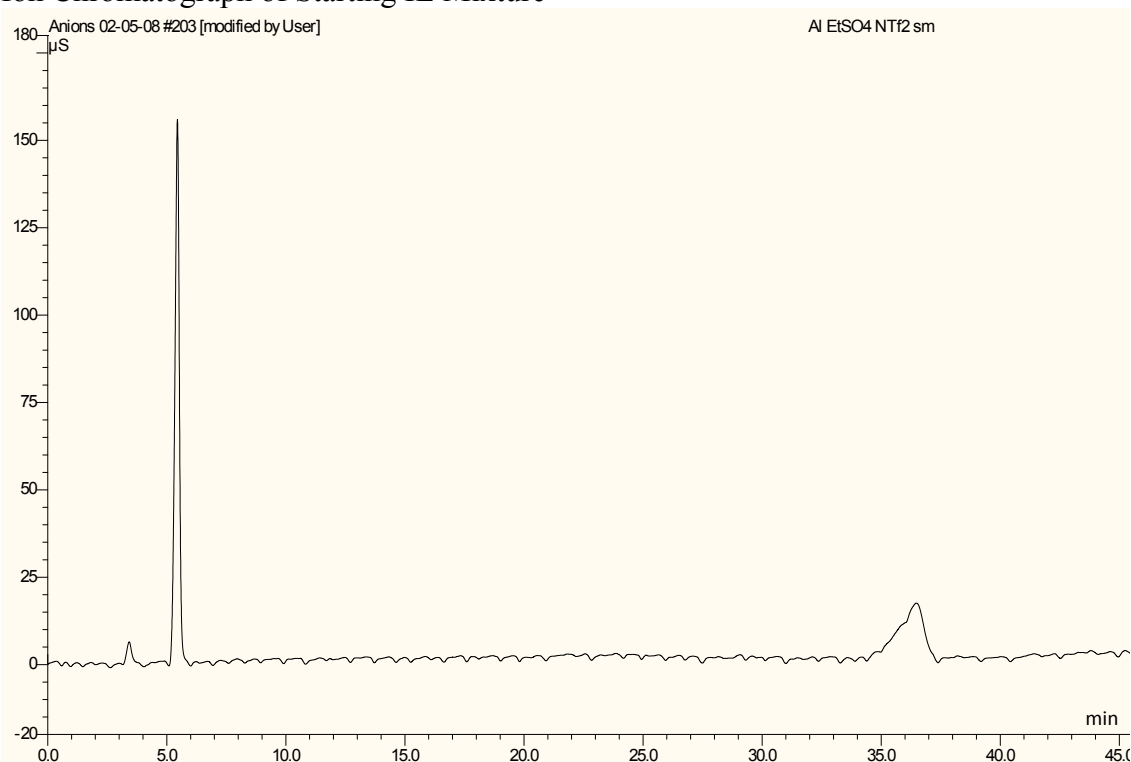
^1H NMR Spectrum of Alkyl Chain Region of Distillate



Ion Chromatographs of starting mixture and residue of CC'AA' mixture =
[C₂C₁Im][C₈C₁Im][Tf₂N] [EtOSO₃].

Anions detected. 5.5 min = [EtSO₄]⁻; 10.5 min = unknown ion; 36 min = [Tf₂N]⁻

Ion Chromatograph of Starting IL Mixture



Ion Chromatograph of Residue after Distillation experiment

