Supplementary Materials

# Thermal and Electrochemical Properties of Ionic Liquids Bearing Allyl Group with Sulfonate-Based Anions—Application Potential in Epoxy Resin Curing Process

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This document includes the synthetic procedure for compounds **1**-**4** from the manuscript. According to the synthetic procedure in the paper previously published by us [1], the following compounds were obtained:

**S1** - 1-Allyl-3-methylimidazolium methylsulfate (**1**)
**S2** - 1-Allyl-3-methylimidazolium methanesulfonate (**2**)
**S3** - 1-Allyl-3-methylimidazolium triflate (**3**)
**S4** - 1-Allyl-3-methylimidazolium tosylate (**4**)

**S1** - 1-Allyl-3-methylimidazolium methylsulfate (**1**)

Yellow liquid; yield: 99%; purity: 98.4%.

$^{1}$H NMR (400 MHz, DMSO-$d_6$): δ = 9.11 (s, 1H), 7.73 (dt, $^{3}J$ = 7.6 Hz, $^{3}J$ = 1.8 Hz, 2H), 6.05 (ddt, $^{3}J$ = 16.3 Hz, $^{3}J$ = 10.3 Hz, $^{3}J$ = 6.0 Hz, 1H), 5.32 (ddd, $^{3}J$ = 6.7 Hz, $^{3}J$ = 4.1 Hz, $^{3}J$ = 1.3 Hz, 2H), 4.85 (d, $^{3}J$ = 6.0 Hz, 2H), 3.88 (s, $^{3}J$ = 7.4 Hz, 3H), 3.41 (s, 3H).

$^{13}$C {$^{1}$H} NMR (100 MHz, DMSO-$d_6$): δ = 137.35, 132.23, 124.23, 122.77, 120.66, 53.43, 51.20, 36.13.

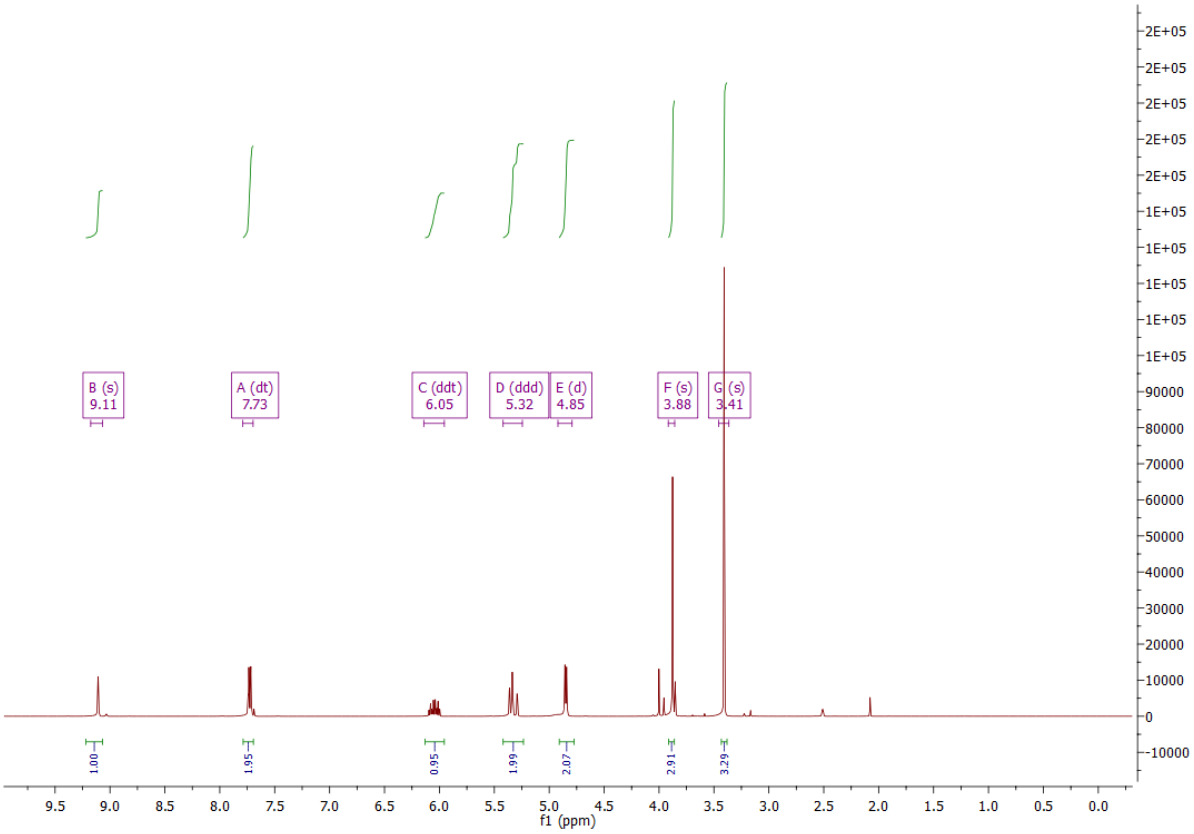


**Figure S1a.** $^{1}$H NMR (400 MHz, DMSO-$d_6$) of **1.**

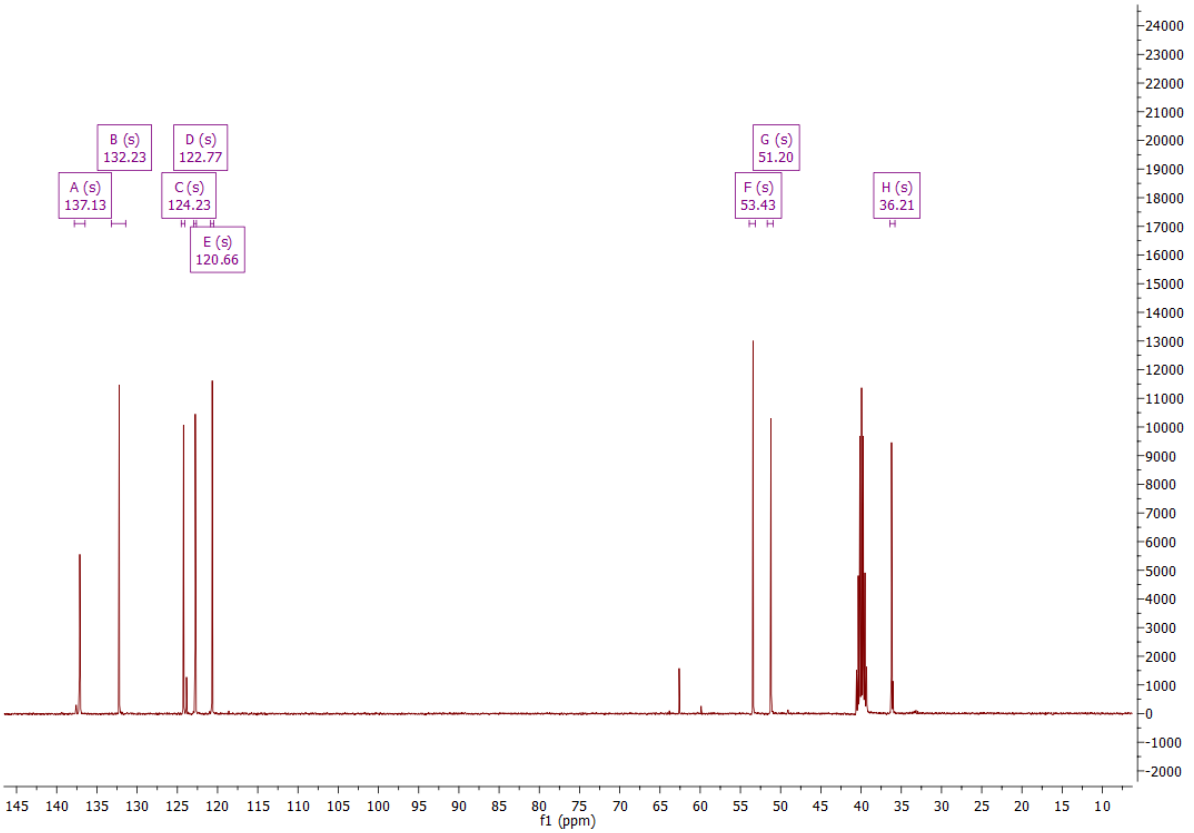


**Figure S1b.** $^{13}$C {$^{1}$H} NMR (100 MHz, DMSO-$d_6$) of **1.**

## **S2** - 1-Allyl-3-methylimidazolium methanesulfonate (**2**)

Yellow liquid; yield: 99.2%; purity: 99.3%.
$^{1}$H NMR (400 MHz, $CDCl_3$): δ = 9.63 (s, 1H), 7.52 (s, 1H), 7.37 (s, 1H), 5.90 (ddt, $^{3}J$ = 16.5 Hz, $^{3}J$ = 10.2 Hz, $^{3}J$ = 6.3 Hz, 1H), 5.31 (t, $^{3}J$ = 13.3 Hz, 2H), 4.79 (d, $^{3}J$ = 6.2 Hz, 2H), 3.91 (s, 3H), 2.61 (s, 3H).
$^{13}$C {$^{1}$H} NMR (100 MHz, $CDCl_3$): δ = 137.63, 130. 22, 123.75, 122.02, 121.97, 51.66, 36.29.

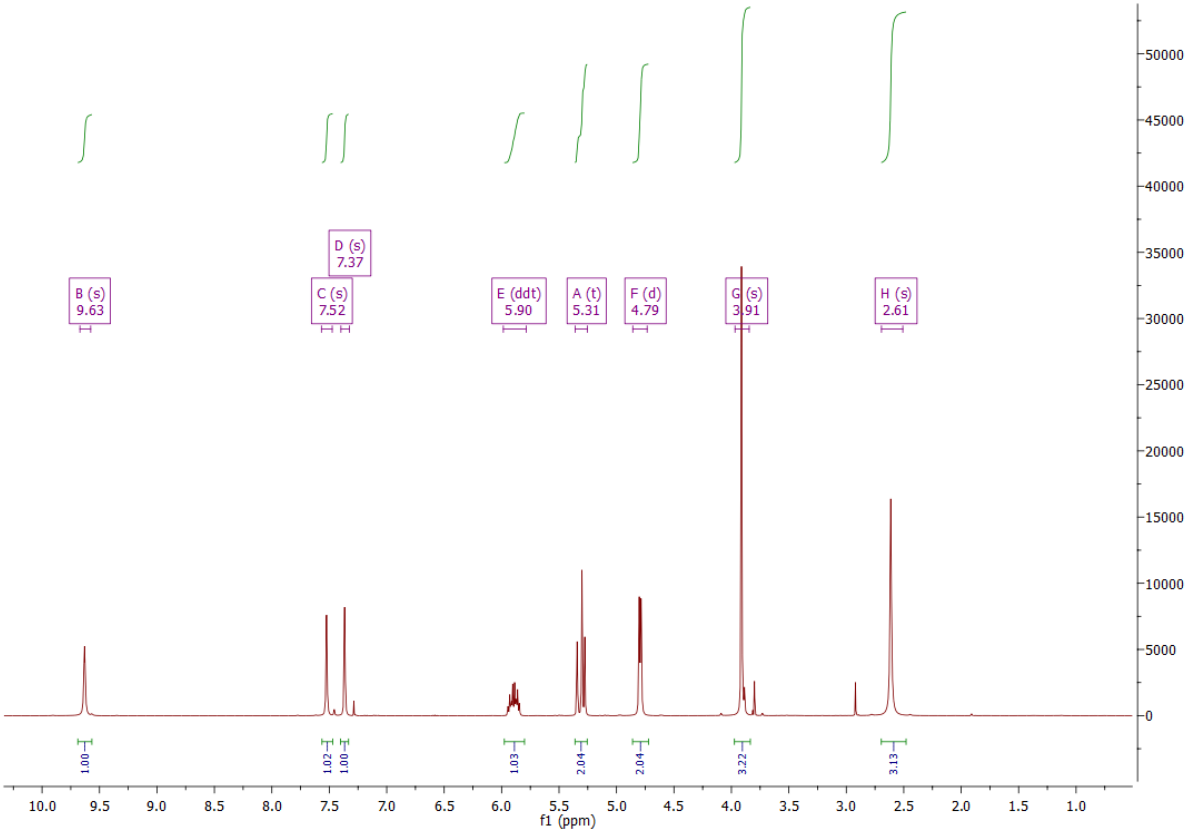


**Figure S2a.** $^{1}$H NMR (400 MHz, $CDCl_3$) of **2.**

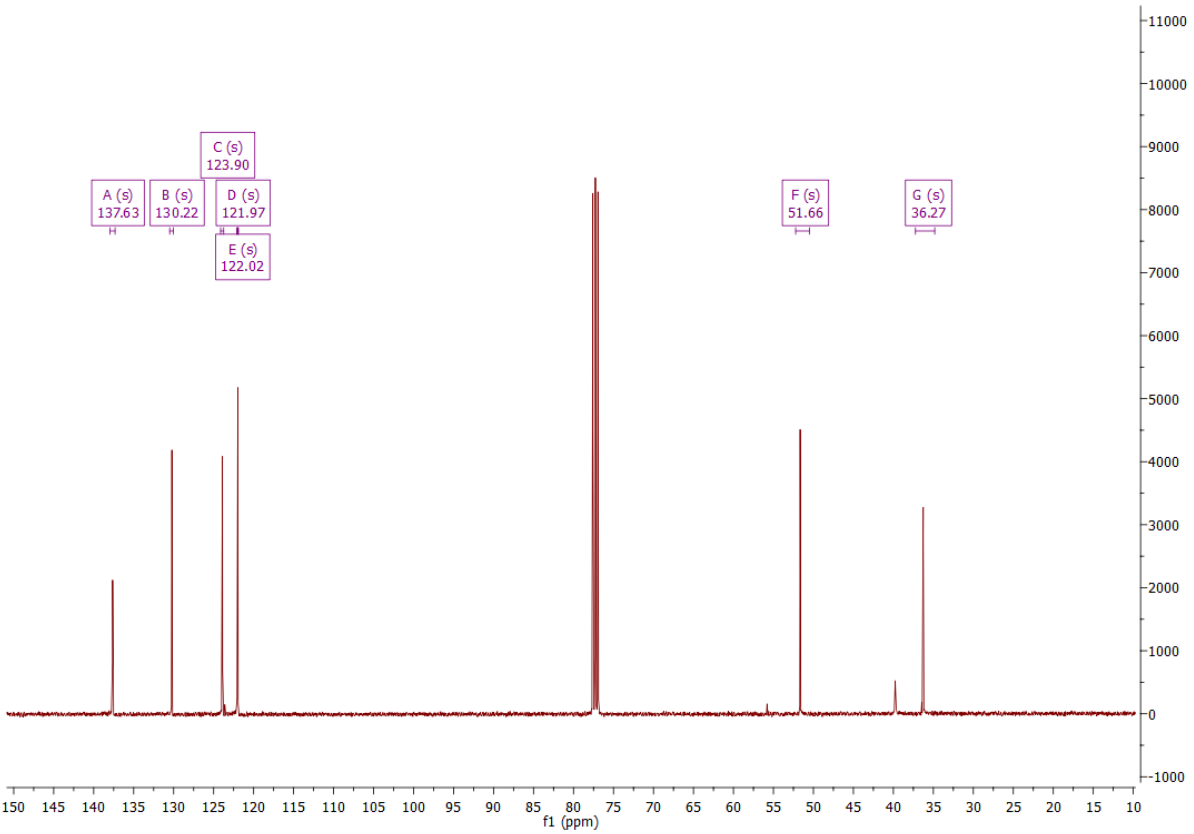


**Figure S2b.** $^{13}$C {$^{1}$H} NMR (100 MHz, $CDCl_3$) of **2**.

**S3** - 1-Allyl-3-methylimidazolium triflate (**3**)

Yellow liquid; yield: 99.5%; purity: 99.5%.

$^{1}$H NMR (400 MHz, DMSO-$d_6$): δ = 9.06 (s, 1H), 7.69 (dt, $^{3}J$ = 7.2 Hz, $^{3}J$ = 1.7 Hz, 2H), 6.03 (ddt, $^{3}J$ = 16.3 Hz, $^{3}J$ = 10.3 Hz, $^{3}J$ = 6.0 Hz, 1H), 5.35 (dt, $^{3}J$ = 5.0 Hz, $^{3}J$ = 2.5 Hz, 1H), 5.30 (dd, $^{3}J$ = 17.1 Hz, $^{3}J$ = 1.3 Hz, 1H), 4.83 (d, $^{3}J$ = 6.0 Hz, 2H), 3.86 (s, 3H)

$^{19}$F NMR (376 MHz, DMSO-$d_6$): δ = −77.87

$^{13}$C {$^{1}$H} NMR (100 MHz, DMSO-$d_6$): δ = 137.04, 132.06, 124.19, 122.72, 121.10 (q, $^{3}J$ = 322.1 Hz), 120.64, 51.24, 36.0.

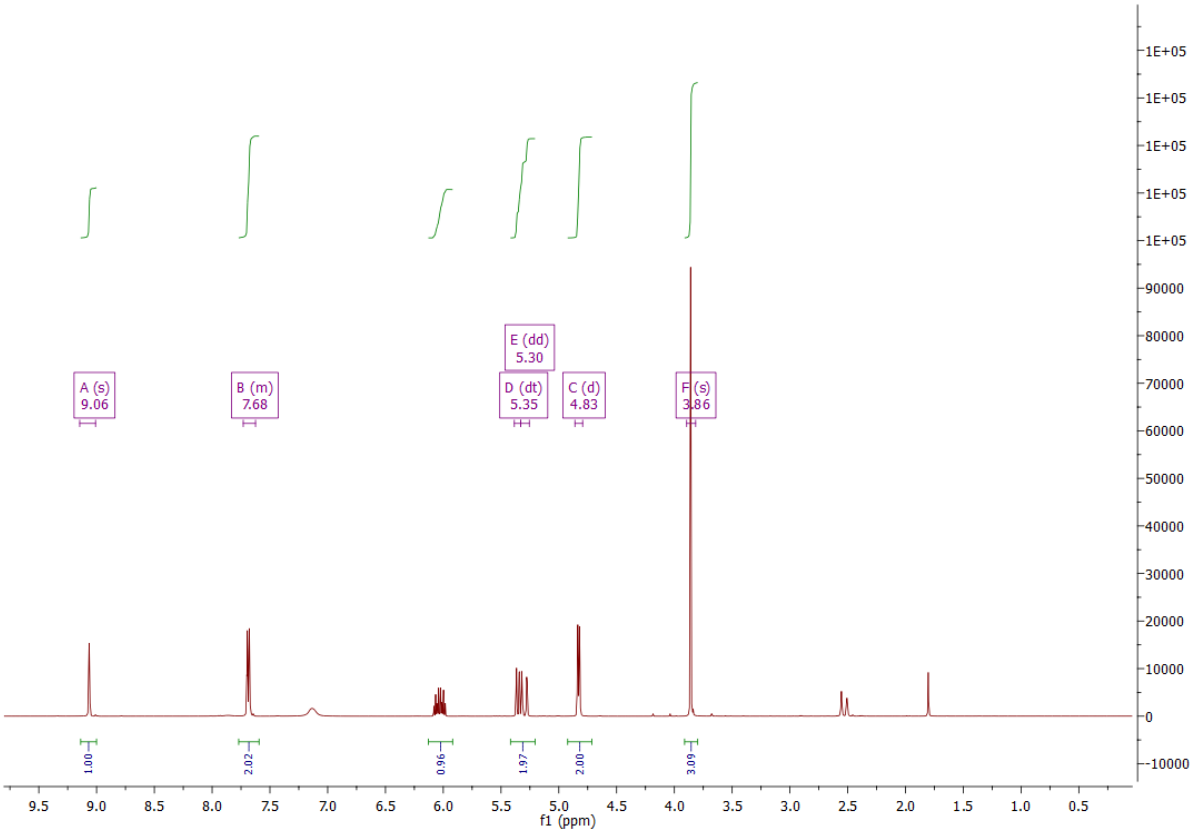


**Figure S3a.** $^{1}$H NMR (400 MHz, DMSO-$d_6$) of **3.**

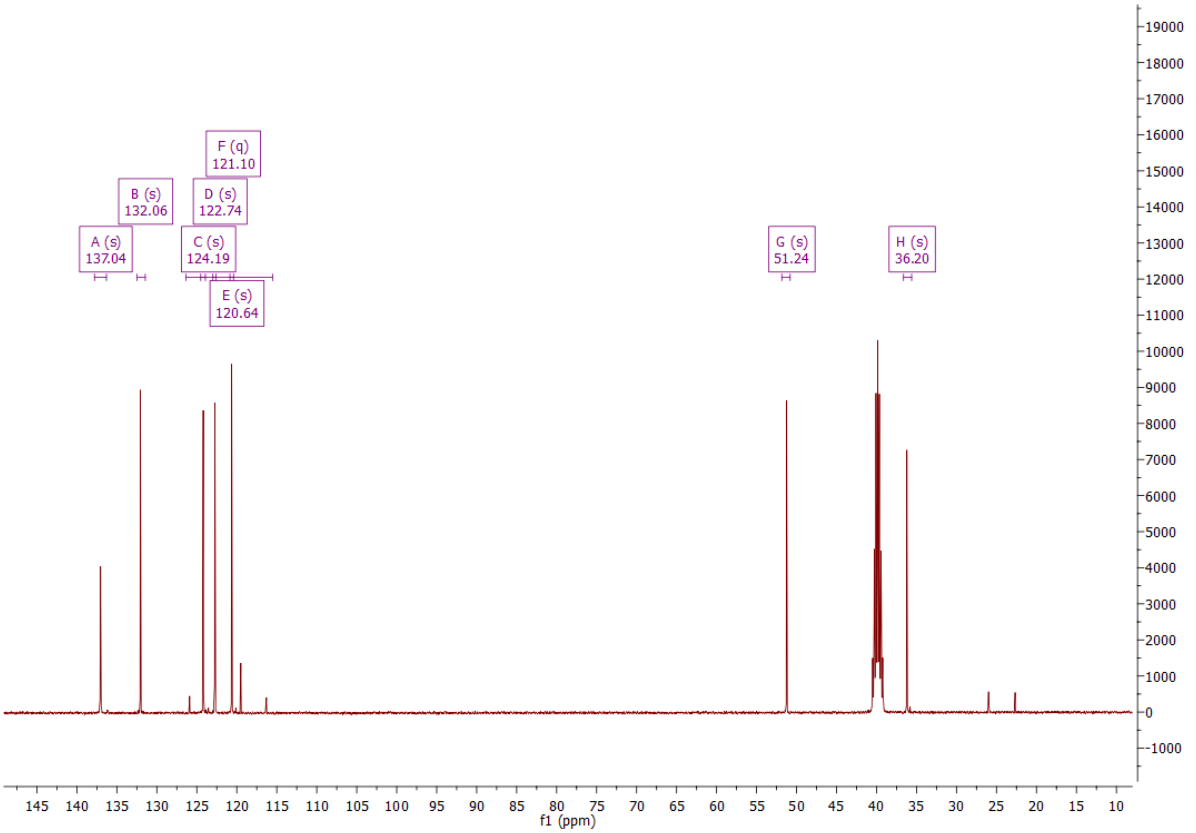


**Figure S3b.** $^{13}$C {$^{1}$H} NMR (100 MHz, DMSO-$d_6$) of **3.**

**S4** - 1-Allyl-3-methylimidazolium tosylate (**4**)

Yellow liquid; yield: 99.1%; purity: 99.2%.

$^{1}$H NMR (400 MHz, $CDCl_3$): δ = 9.50 (s, 1H), 7.66 (d, $^{3}J$ = 7.5 Hz, 2H), 7.46 (s, 1H), 7.29 (s, 1H), 7.07 (d, $^{3}J$ = 7.3 Hz, 2H), 5.82 (ddt, $^{3}J$ = 16.5 Hz, $^{3}J$ = 10.2 Hz, $^{3}J$ = 6.3 Hz, 1H), 5.25 (dd, $^{3}J$ = 13.6 Hz, $^{3}J$ = 7.2 Hz, 2H), 4.69 (d, $^{3}J$ = 6.2 Hz, 2H), 3.81 (s, 3H), 2.27 (s, 3H).

$^{13}$C {$^{1}$H} NMR (100 MHz, $CDCl_3$): δ = 139.39, 137.34, 130.18, 128.66, 125.70, 123.92, 121.98, 121.90, 51.61, 36.20, 21.22.

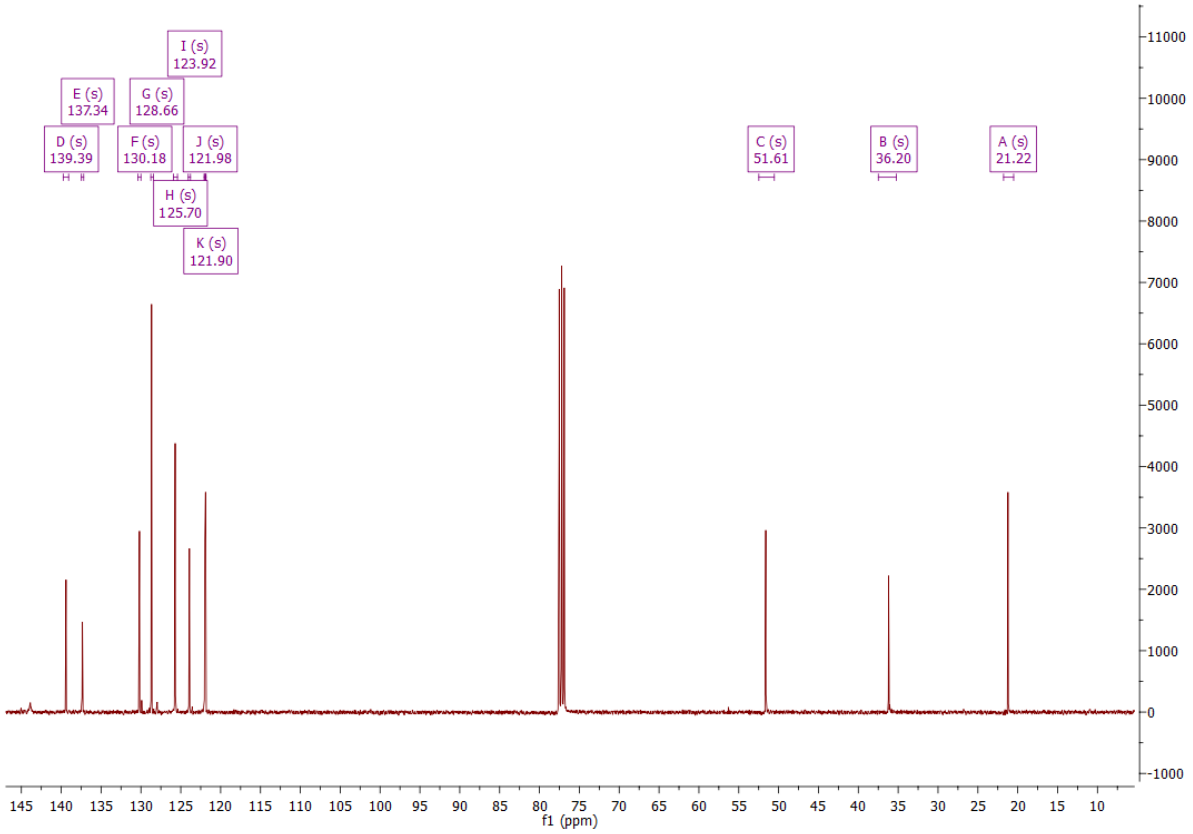


**Figure S4a.** $^{1}$H NMR (400 MHz, $CDCl_3$) of **4.**

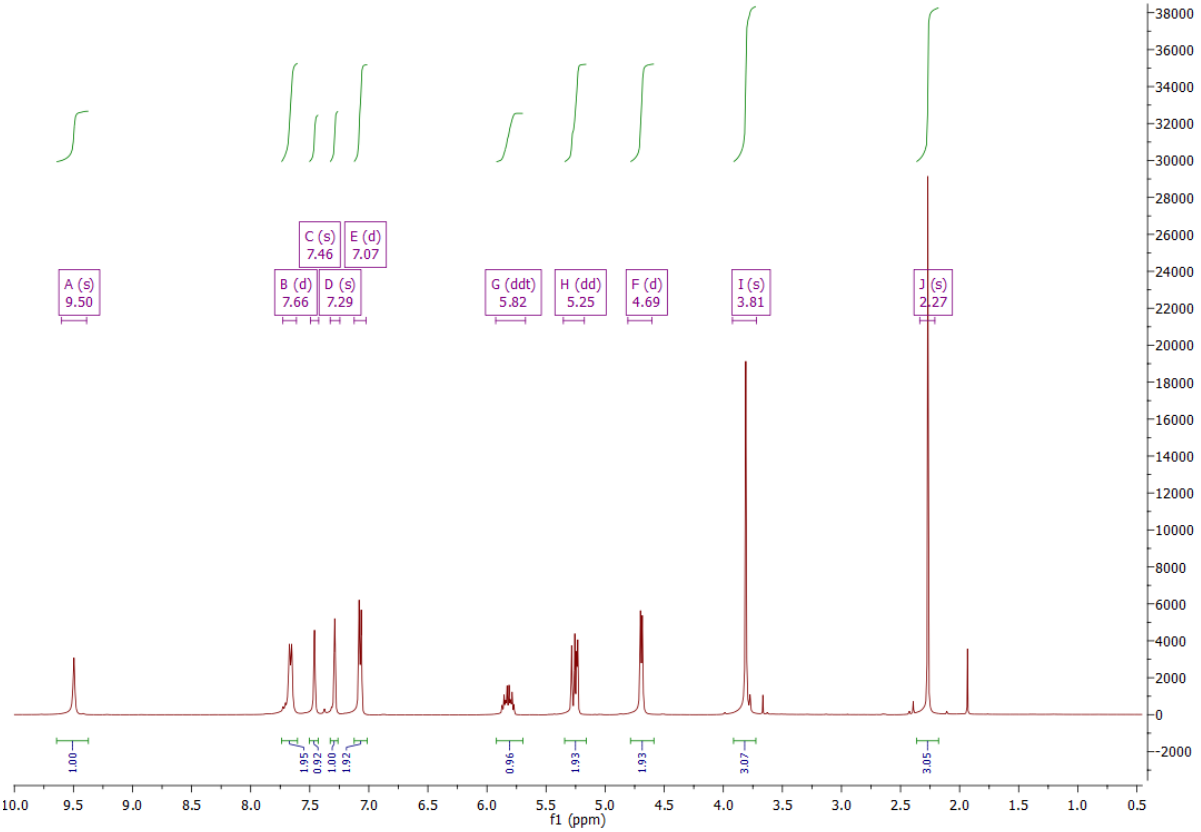


**Figure S4b.** $^{13}$C {$^{1}$H} NMR (100 MHz, $CDCl_3$) of **4.**

**References**

1. Szpecht, A.; Zajac, A.; Zielinski, D.; Maciejewski, H.; Smiglak, M. Versatile Method for the Simultaneous Synthesis of Two Ionic Liquids, Otherwise Difficult to Obtain, with High Atom Economy. *ChemistryOpen* **2019**, *8*, 972–983, doi:10.1002/open.201900217.