

# Cross-Linking and Evaluation of the Thermo-Mechanical Behavior of Epoxy Based Poly(Ionic Liquid) Thermosets

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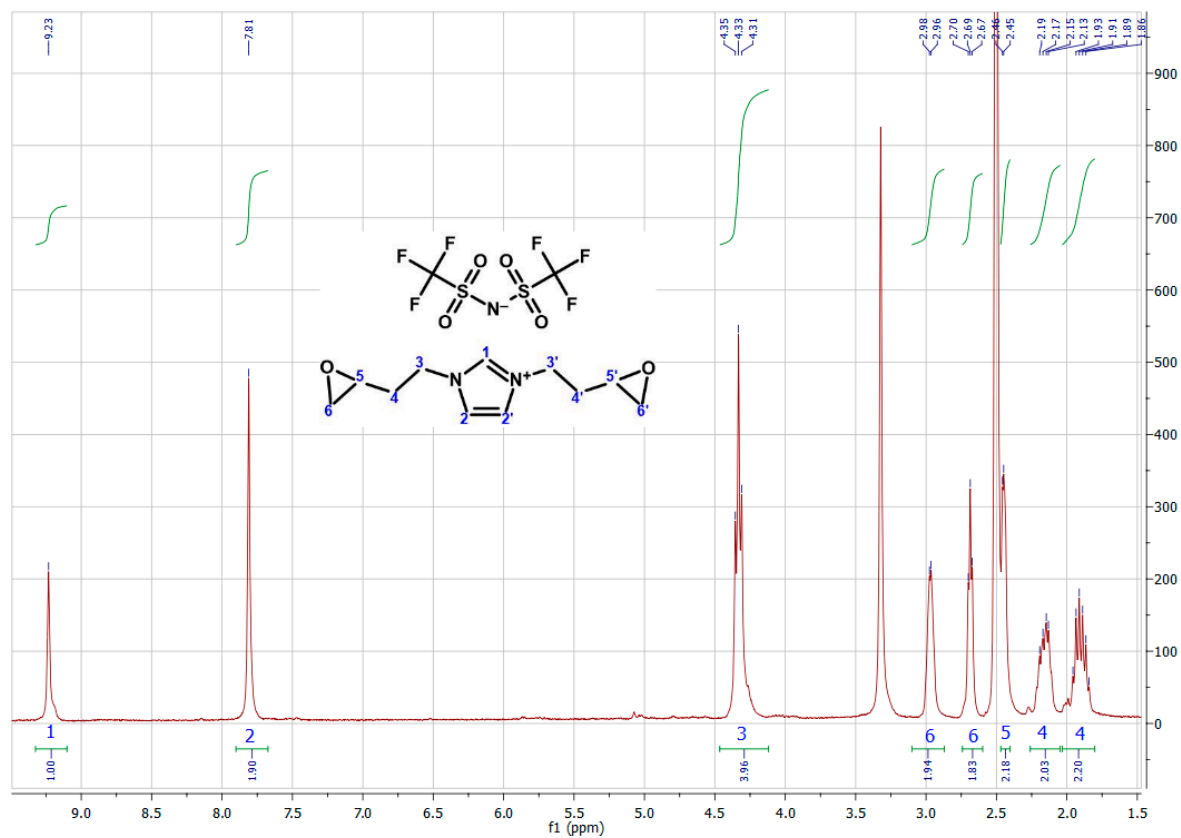
## Spectroscopic data of 1,3-bis(2-oxiranyl-ethyl)imidazolium bis(trifluoromethane)sulfonimide (IL-E):

<sup>1</sup>H-NMR (300 MHz, DMSO-d<sub>6</sub>): 1.90 (td, 2H), 2.16 (dd, 2H), 2.45 (d, 2H), 2.69 (t, 2H), 2.97 (d, 2H), 4.33 (t, 4H), 7.81 (s, 2H), 9.23 (s, 1H)

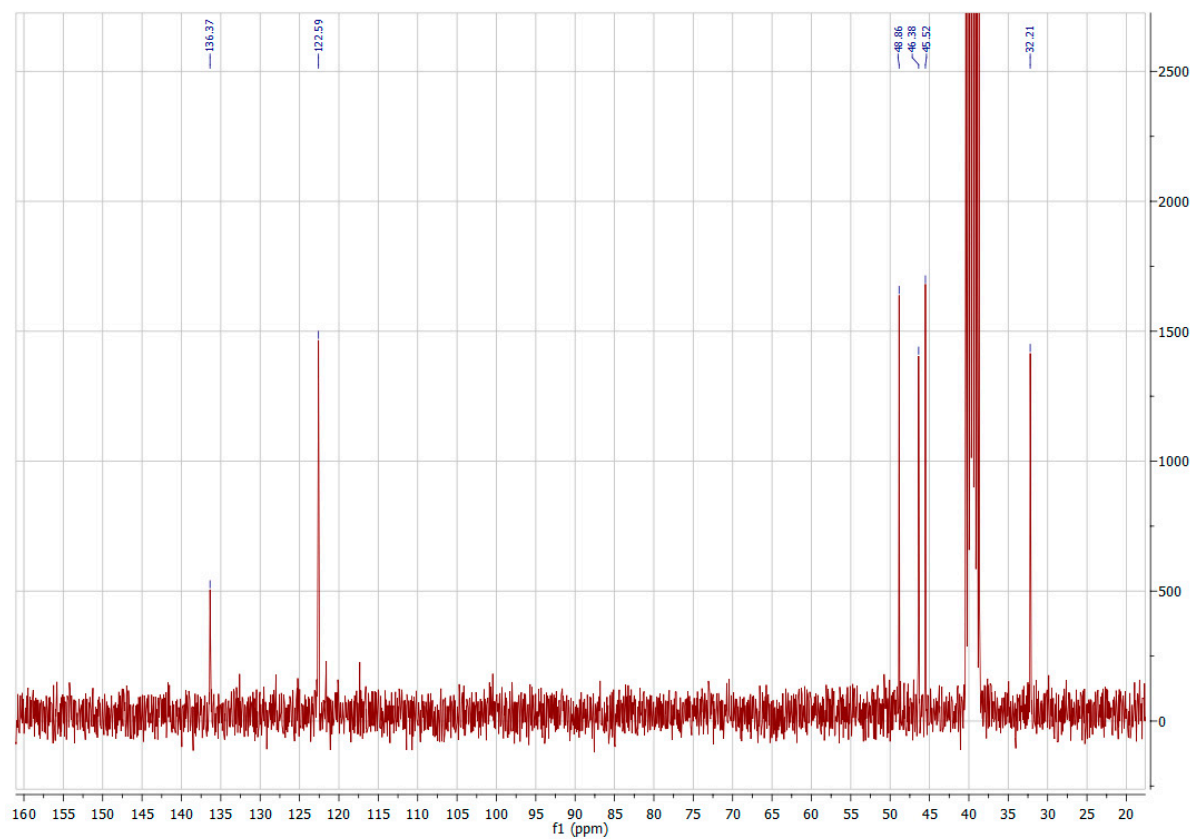
<sup>13</sup>C-NMR (300 MHz, DMSO-d<sub>6</sub>): 32.21, 45.52, 46.38, 48.86, 122.59, 136.37

FTIR (ATR, cm<sup>-1</sup>): 406, 509, 569, 599, 611, 653, 740, 763, 789, 841, 916, 1052, 1132, 1179, 1330, 1348, 1462, 1566, 3152

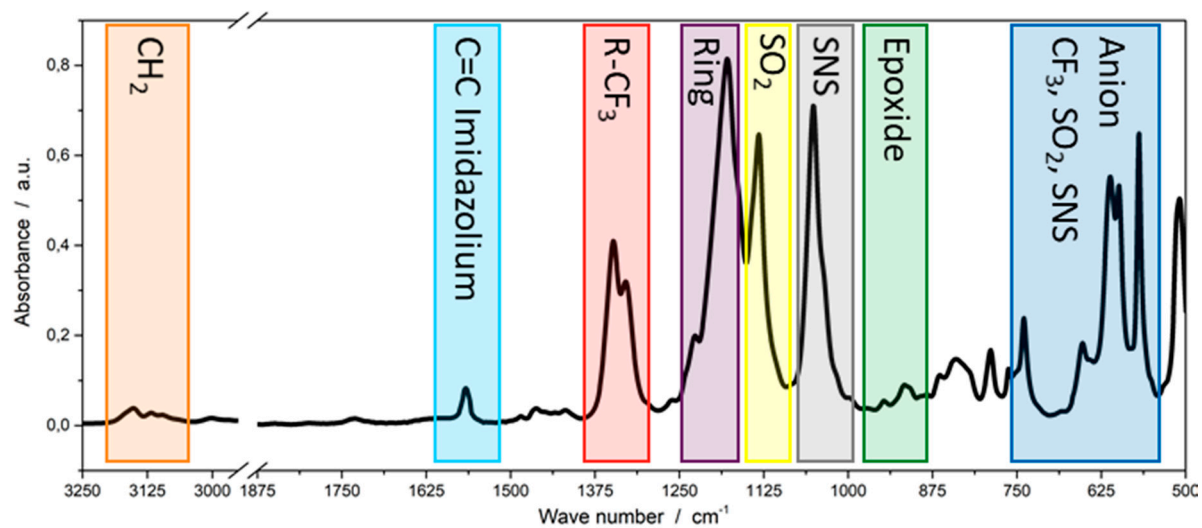
<sup>1</sup>H-NMR (Figure S1) and FTIR (Figure S3) spectra confirm the chemical structure of IL-E and are in good agreement with data published by other authors [1]. Due to overlapping signals in the FTIR spectrum, not all signals could be individually assigned to the respective vibration modes. However, the obtained signals show good correlation with literature values [2,3]. Characteristic frequency ranges of the respective groups are additionally highlighted in Figure S3. In the <sup>13</sup>C-NMR spectrum, not all signals predicted for CF<sub>3</sub> groups of the anion in IL-E were detected. However, the anion's presence is confirmed in FTIR scans, and furthermore by the change of hydrophilicity to hydrophobicity during the metathesis reaction of bromide to bis(trifluoromethane)sulfonimide.



**Figure S1.**  $^1\text{H}$ -NMR spectrum of IL-E.



**Figure S2.**  $^{13}\text{C}$ -NMR spectrum of IL-E.



**Figure S3.** FTIR-spectrum of IL-E with corresponding characteristic frequency regions.

## References

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2. Kiefer, J.; Fries, J.; Leipertz, A. Experimental vibrational study of imidazolium-based ionic liquids: Raman and infrared spectra of 1-ethyl-3-methylimidazolium bis(trifluoromethylsulfonyl)imide and 1-ethyl-3-methylimidazolium ethylsulfate. *Appl. Spectrosc.* **2007**, *61*, 1306–1311, doi:10.1366/000370207783292000.
3. Boumediene, M.; Haddad, B.; Paolone, A.; Draï, M.; Villemin, D.; Rahmouni, M.; Bresson, S.; Abbas, O. Synthesis, thermal stability, vibrational spectra and conformational studies of novel dicationic meta-xylyl linked bis-1-methylimidazolium ionic liquids. *Journal of Molecular Structure* **2019**, *1186*, 68–79, doi:10.1016/J.MOLSTRUC.2019.03.019.