

Supplementary Information

# Understanding the Effect of Side Reactions on the Recyclability of Furan-Maleimide Resins Based on Thermoreversible Diels-Alder Network

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**Citation:** To be added by editorial staff during production.

Academic Editor: Firstname Last-name

Received: date

Revised: date

Accepted: date

Published: date



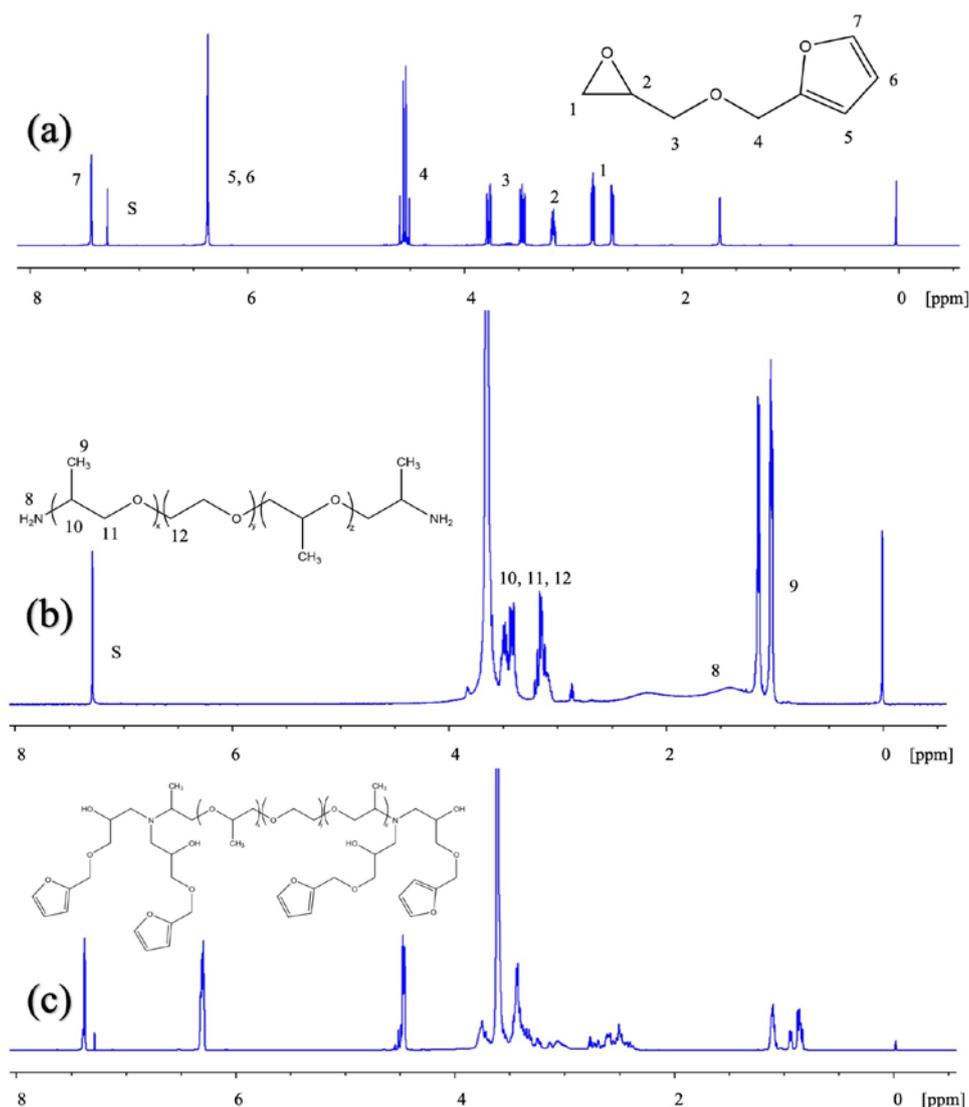
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**Table S1.** Property table with molecular weight, specific volume, and molar volume

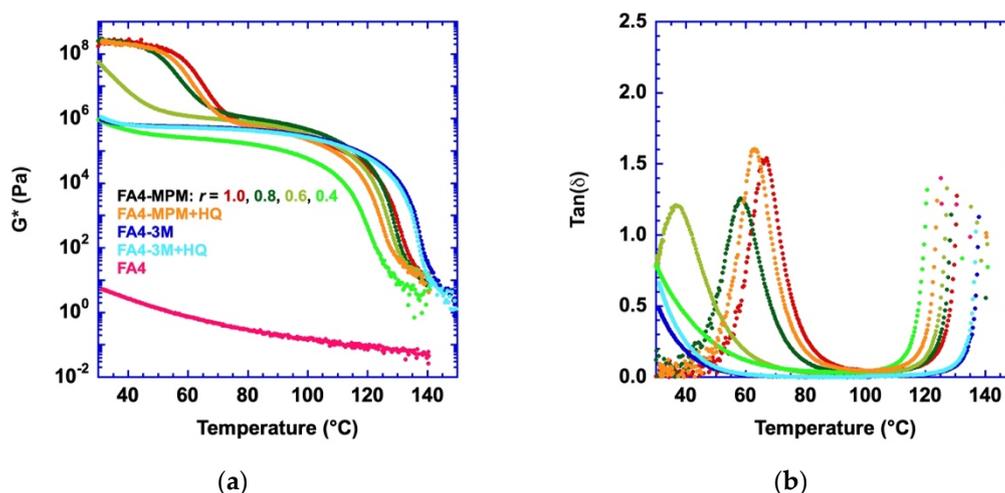
Precursor	Molar Mass (g/mol)	Specific Volume (mL/g)	Molar Volume (mL/mol)
ED-600	528	0.966	510
T-403	486	1.02	496
FGE	154	0.891	137
FA4	1145	0.926	1060
MPM	358	0.749	268
3M	726	0.890	646

**Table S2.** Molarity of furan and maleimide moieties in the DA polymers

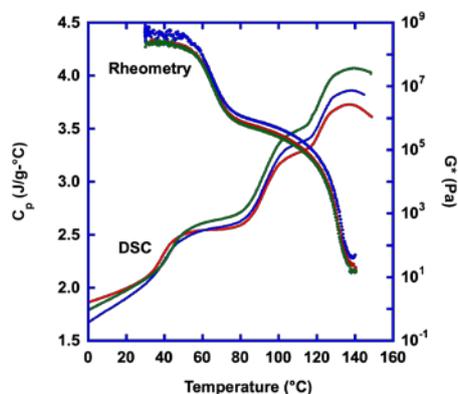
DA Polymer ( $r = \text{nominal}$ )	[M] (mol/L)	[F] (mol/L)	Precise $r =$ [M]/[F]	[M] (mol/L)	[F] (mol/L)
FA4-MPM(0.4)	1.26	3.14	0.384	1.21	3.16
FA4-MPM(0.6)	1.74	2.90	0.573	1.68	2.93
FA4-MPM(0.8)	2.15	2.69	0.777	2.10	2.71
FA4-MPM(1.0)	2.51	2.51	0.968	2.45	2.53
FA4-3M(1.0)	2.08	2.08	~1.0		

**Figure S1.**  $^1\text{H-NMR}$  spectra and assignments of (a) FGE, (b) Jeffamine ED-600 and (c) FA4.

NMR scans were performed using a Bruker Avance III 400 in deuterated chloroform solution. **Figure S1** represents the  $^1\text{H}$ -NMR spectra of FA4 and its precursors. The broad signal present from 1.2 ppm to 1.75 ppm in Jeffamine ED-600 is attributed to the amine hydrogens. It is crucial that the epoxy-amine reaction is complete as the unreacted amine can undergo a Michael addition reaction with maleimide to form an irreversible network. The amine chemical peak shift cannot be observed in FA4, signifying that the epoxy-amine reaction is complete.



**Figure S2.** Samples corresponding to **Figure 1(a)** and **Figure 9(a)** that were initially cooled from 140 – 150 $^{\circ}\text{C}$  plotting (a) Complex viscoelastic modulus and (b)  $\text{Tan}(\delta)$ .



**Figure S3.** FA4-MPM samples run in triplicate to confirm reproducibility of characteristic features from DSC (10 $^{\circ}\text{C}/\text{min}$ ) and rheometry (2 $^{\circ}\text{C}/\text{min}$ )