

Supplementary Information

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

Brandon T. McReynolds ^{1,†}, Kavon D. Mojtabai ^{2,†}, Nicole Penners ², Gaeun Kim ², Samantha Lindholm ², Youngmin Lee ², John D. McCoy, and Sanchari Chowdhury ^{2,*}

¹ Department of Chemical Engineering

² Department of Materials and Metallurgical Engineering

New Mexico Institute of Mining and Technology, Socorro, NM

* Correspondence: sanchar.chowdhury@nmt.edu, youngmin.lee@nmt.edu, and john.mccoy@nmt.edu

† These authors contributed equally to this work.

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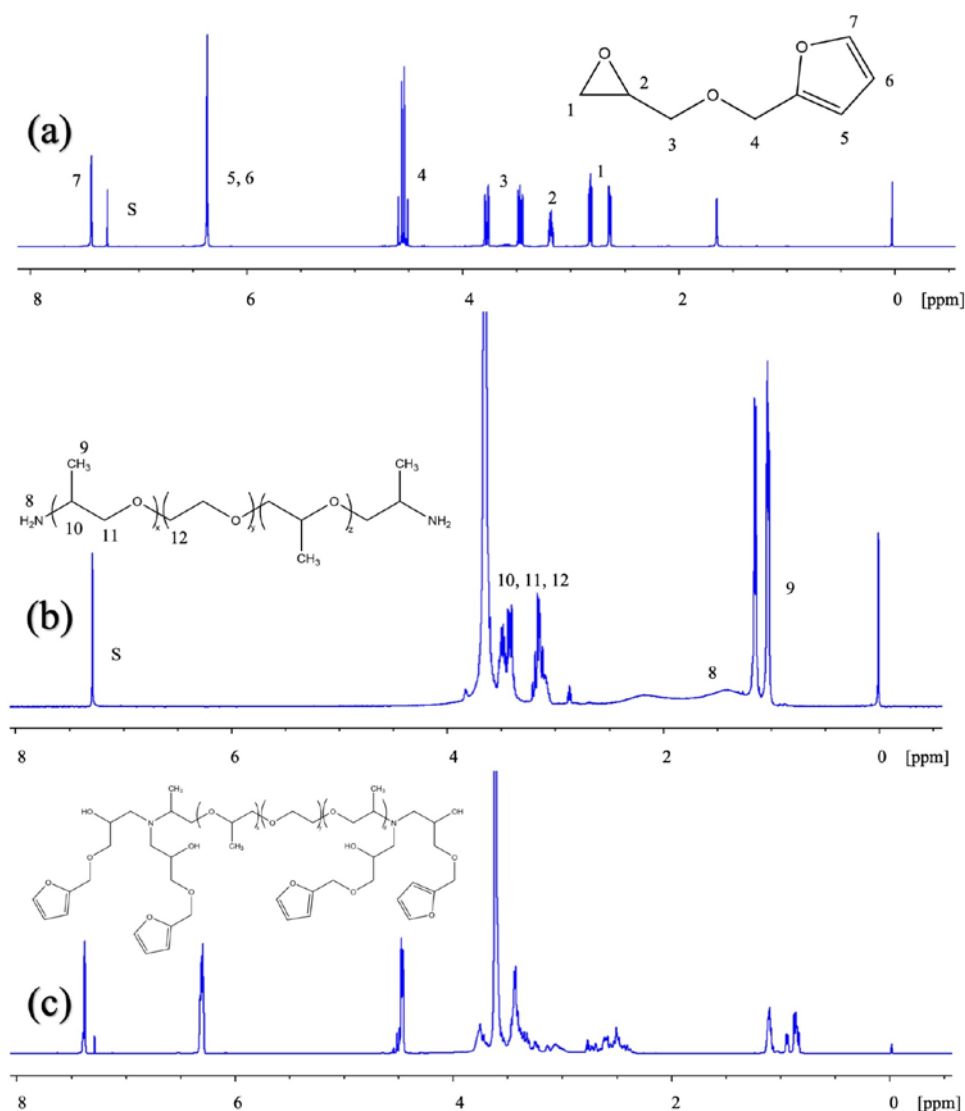
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Table S1. Property table with molecular weight, specific volume, and molar volume

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.** ^1H -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 ^1H -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.

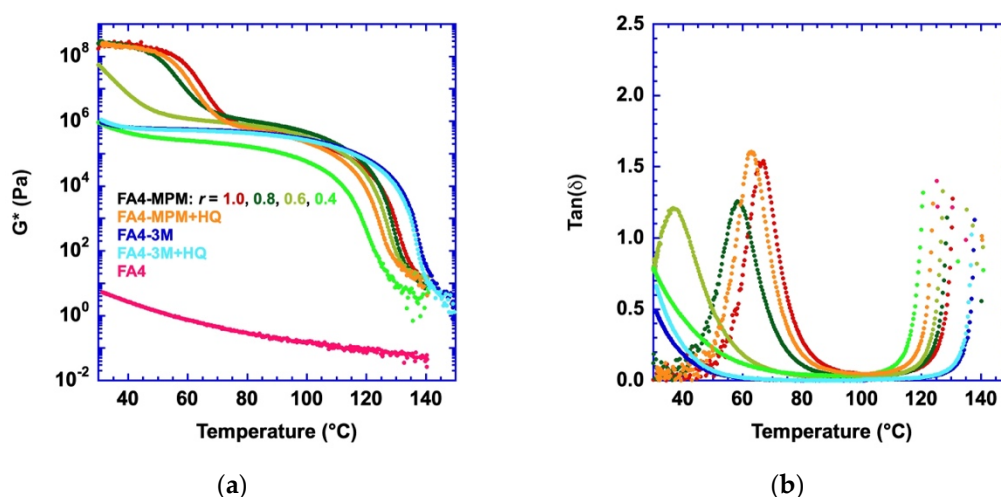


Figure S2. Samples corresponding to **Figure 1(a)** and **Figure 9(a)** that were initially cooled from 140 – 150°C plotting (a) Complex viscoelastic modulus and (b) $\tan(\delta)$.

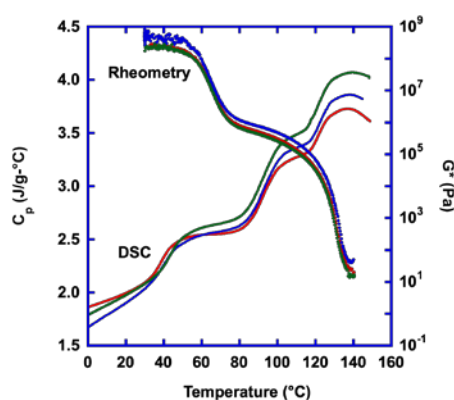


Figure S3. FA4-MPM samples run in triplicate to confirm reproducibility of characteristic features from DSC (10°C/min) and rheometry (2°C/min)