

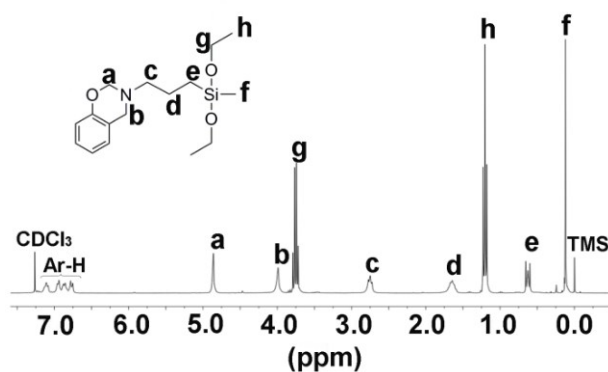
## Electronic Supplementary Information

### Reprocessable and Degradable Thermoset with High $T_g$ Cross-linked via Si-O-Ph Bonds

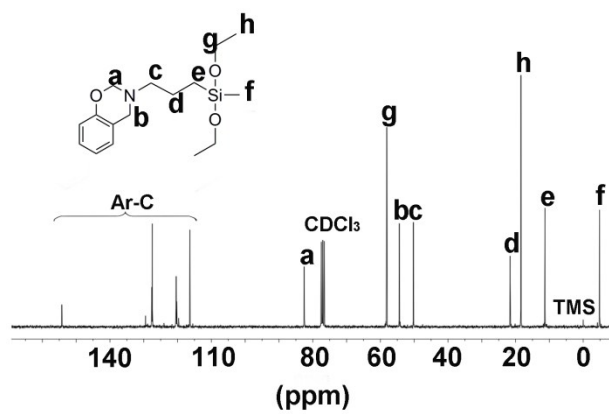
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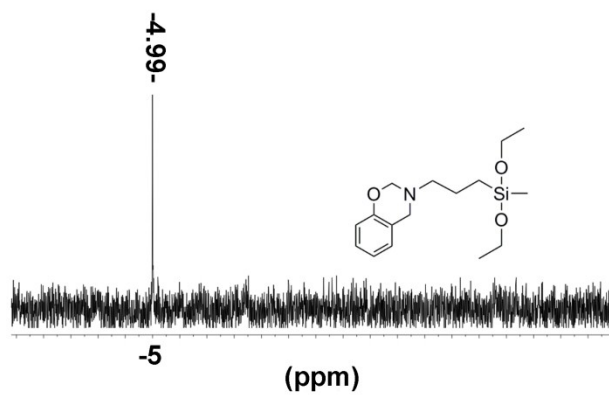
\* Corresponding Author: z.lu@sdu.edu.cn



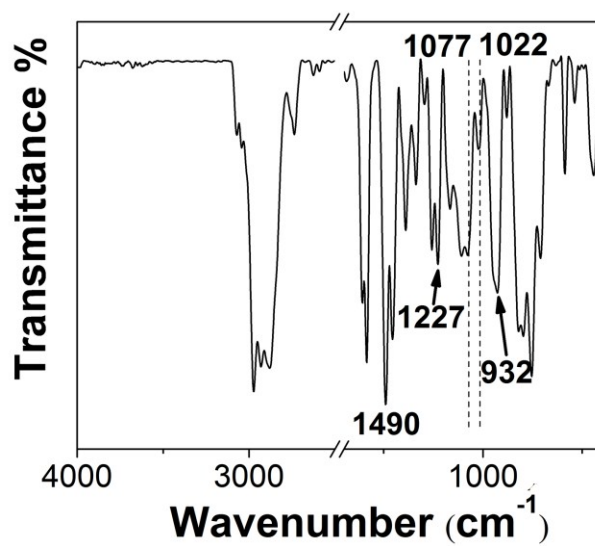
**Fig. S1**  $^1\text{H}$ -NMR spectrum of P-mdes



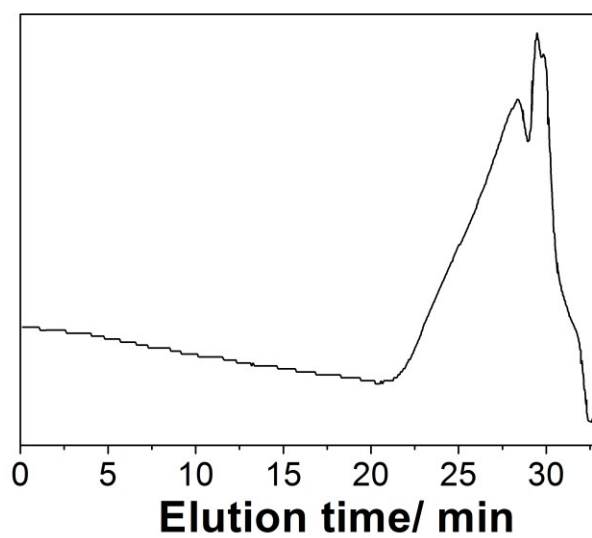
**Fig. S2**  $^{13}\text{C}$ -NMR spectrum of P-mdes



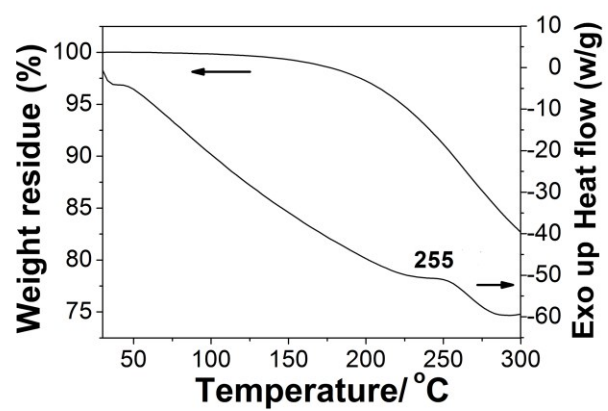
**Fig. S3**  $^{29}\text{Si}$ -NMR spectrum of P-mdes



**Fig. S4** FTIR spectrum of P-mdes



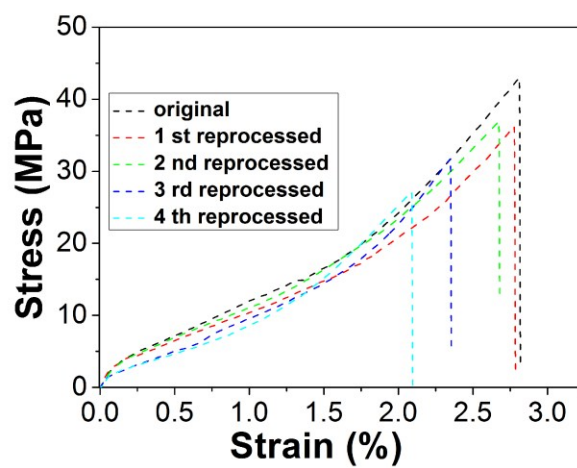
**Fig. S5** SEC chromatogram of poly(P-mdes) oligomer (cured at 200 °C)



**Fig. S6** DSC and TGA curves of the poly(P-mdes) oligomer (cured at 200 °C)

**Table S1** Original data of the tensile strength of the original and reprocessed poly(P-mdes)

| No.           | original | 1st rep. | 2nd rep. | 3rd rep. | 4th rep. |
|---------------|----------|----------|----------|----------|----------|
| 1             | 32.69500 | 30.34927 | 30.21821 | 36.47024 | 30.38352 |
| 2             | 43.38833 | 32.65585 | 29.16310 | 31.83968 | 29.53646 |
| 3             | 42.97166 | 35.91793 | 36.19005 | 30.01786 | 26.21667 |
| 4             | 37.47667 | 36.28077 | 36.94588 | 28.37865 | 32.68168 |
| 5             | 40.78000 | 35.57143 | 36.22488 | 27.45118 | 27.17868 |
| Average value | 39.46    | 34.16    | 33.75    | 30.83    | 29.20    |
| Variance      | 4.45     | 2.57     | 3.74     | 3.88     | 2.58     |



**Fig. S7** Stress-strain curves of the original and reprocessed poly(P-mdes)

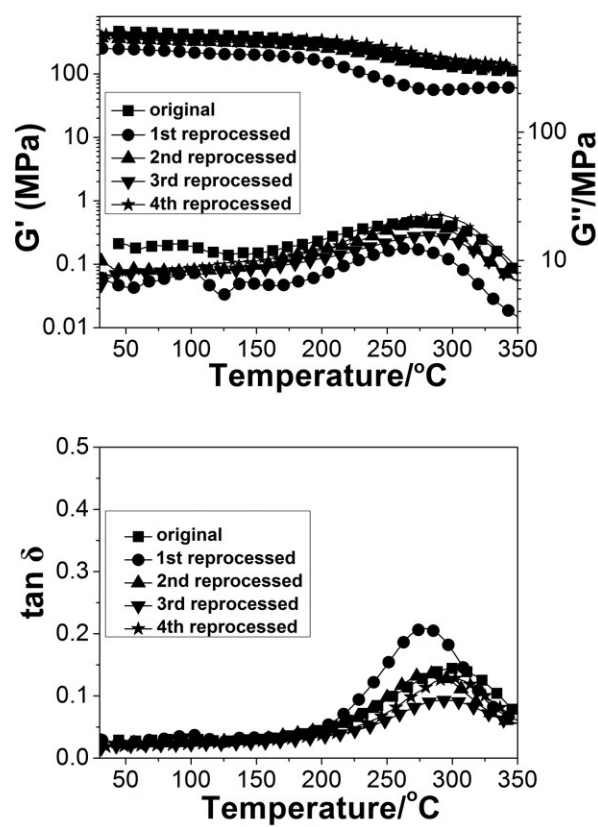


Fig. S8 DMA thermograms of the original and reprocessed poly(P-mdes)

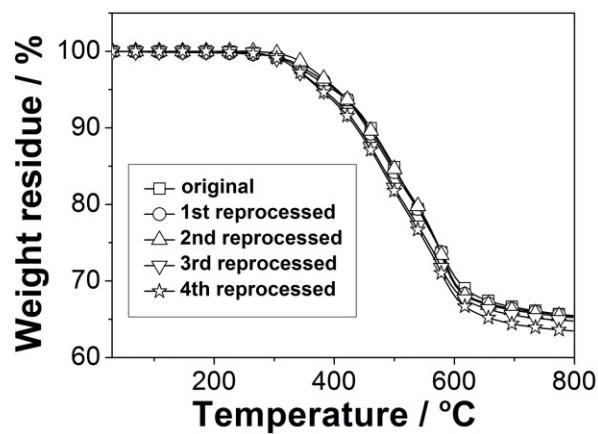
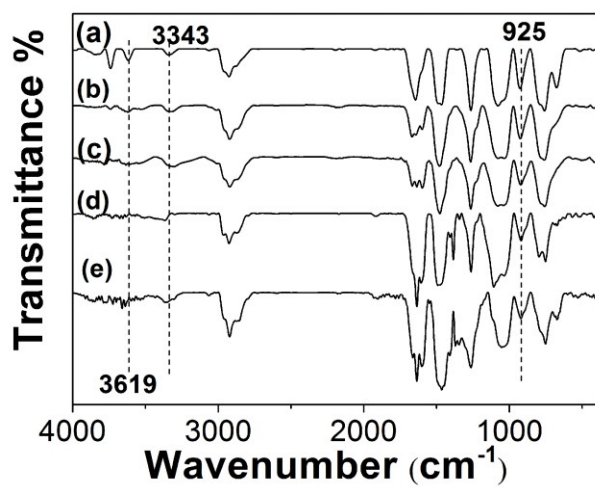
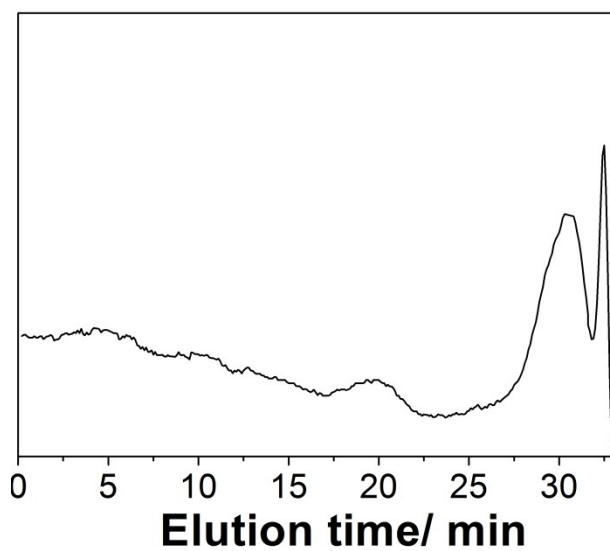


Fig. S9 TGA thermograms of the original and reprocessed poly(P-mdes) in  $N_2$

atmosphere



**Fig. S10** FTIR spectra of (a) original poly(P-mdes), (b) 1st reprocessed poly(P-mdes), (c) 2nd reprocessed poly(P-mdes), (d) 3rd reprocessed poly(P-mdes), (e) 4th reprocessed poly(P-mdes)



**Fig. S11** SEC chromatogram of the decomposed poly(P-mdes)

**Table S2** Solvent resistance of the poly(P-mdes)

|              | Toluene | Acetone | Chloroform | Tetrahydrofuran | Ethanol | Water |
|--------------|---------|---------|------------|-----------------|---------|-------|
| Poly(P-mdes) | -       | -       | -          | -               | -       | -     |

+ swelling

- no swelling