

## Supporting Information

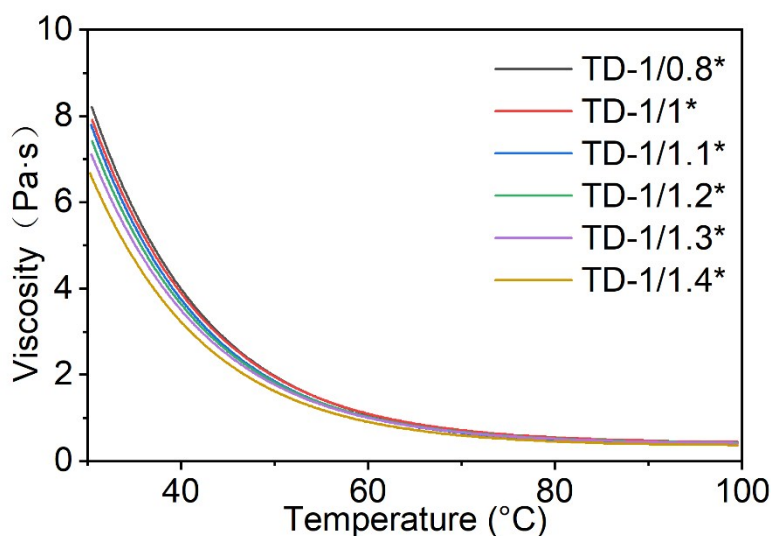
### Catalyst-Free Vitrimer Elastomer based on Dimer Acid: Robust Mechanical Performance, Adaptivity and Hydrothermal Recyclability

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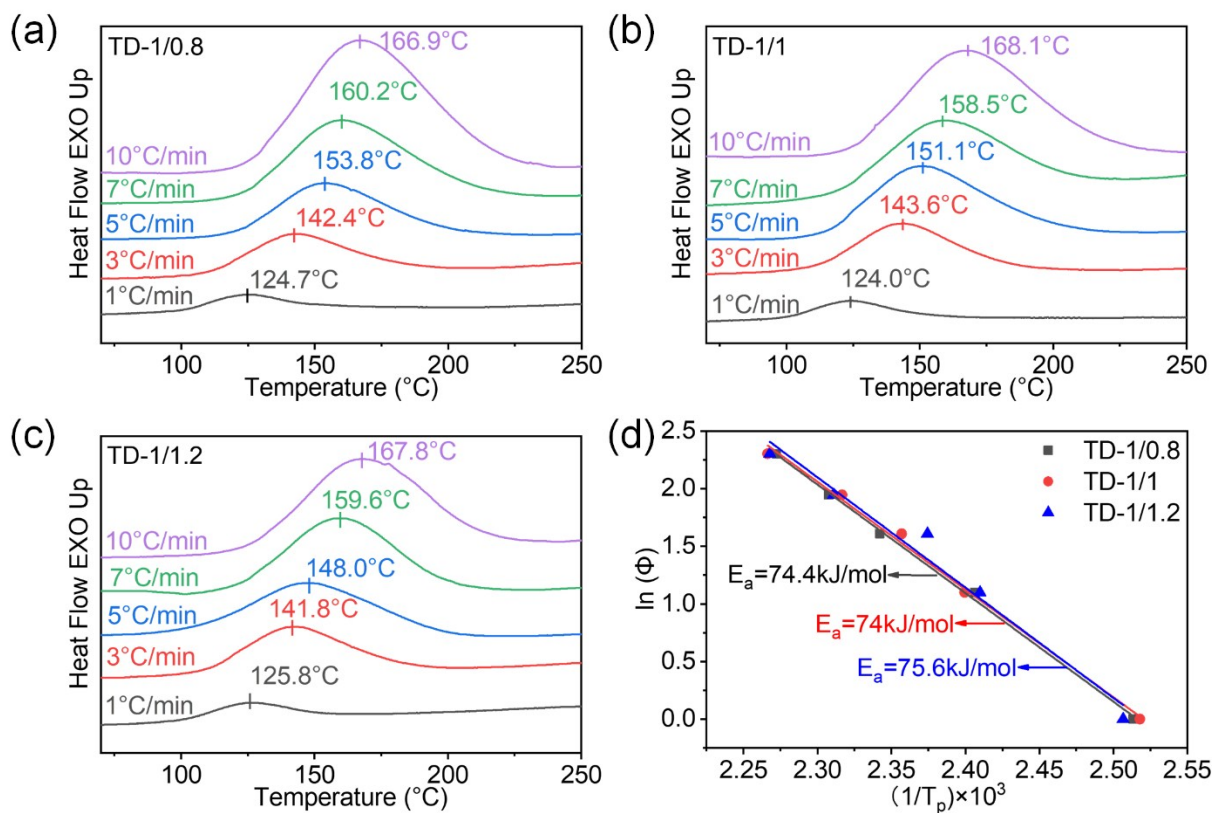
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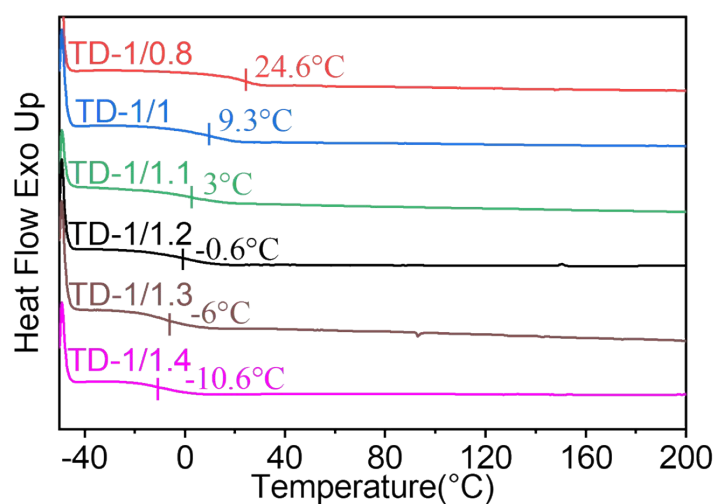
<sup>†</sup> Yingyi Li and Tuan Liu contributed equally to this work.



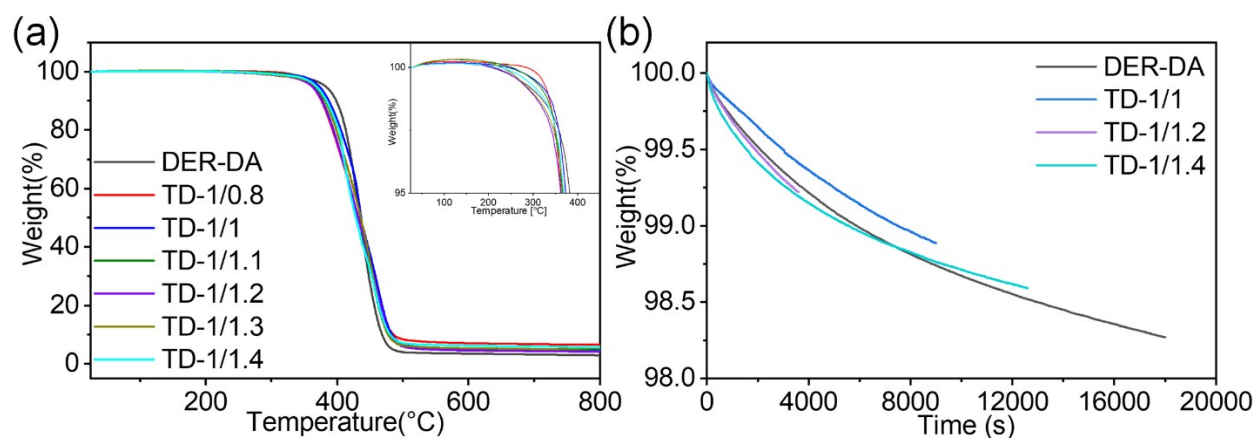
**Figure S1** Viscosity vs temperature of TD elastomers before curing. The test was performed at a constant heating rate of 3 °C min<sup>-1</sup>, and the shear rate was 1 s<sup>-1</sup>. All compositions were liquid and exhibited a relatively low viscosity of blow ~ 10 Pa·s at 30 °C.



**Figure S2** DSC thermograms of nonisothermal curing of TGDDM and DA at different E/COOH ratios of (a) 1:0.8, (b) 1:1, (c) 1:1.2; (d) fitting of  $T_p$  and  $\phi$  to Eq. 4.



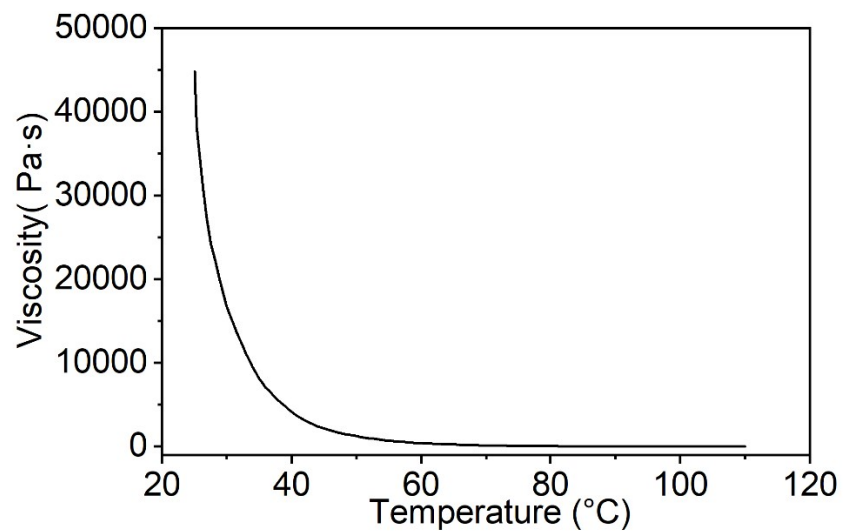
**Figure S3** Full DSC thermograms of Figure 3a.



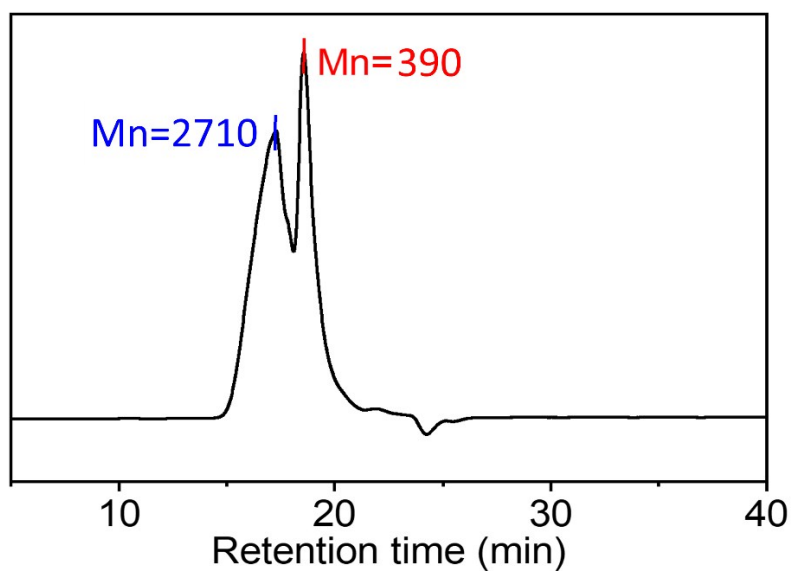
**Figure S4** (a) TGA heating curves of the cured polymers; (b) TGA isothermal curves of the cured polymers at 200 °C.



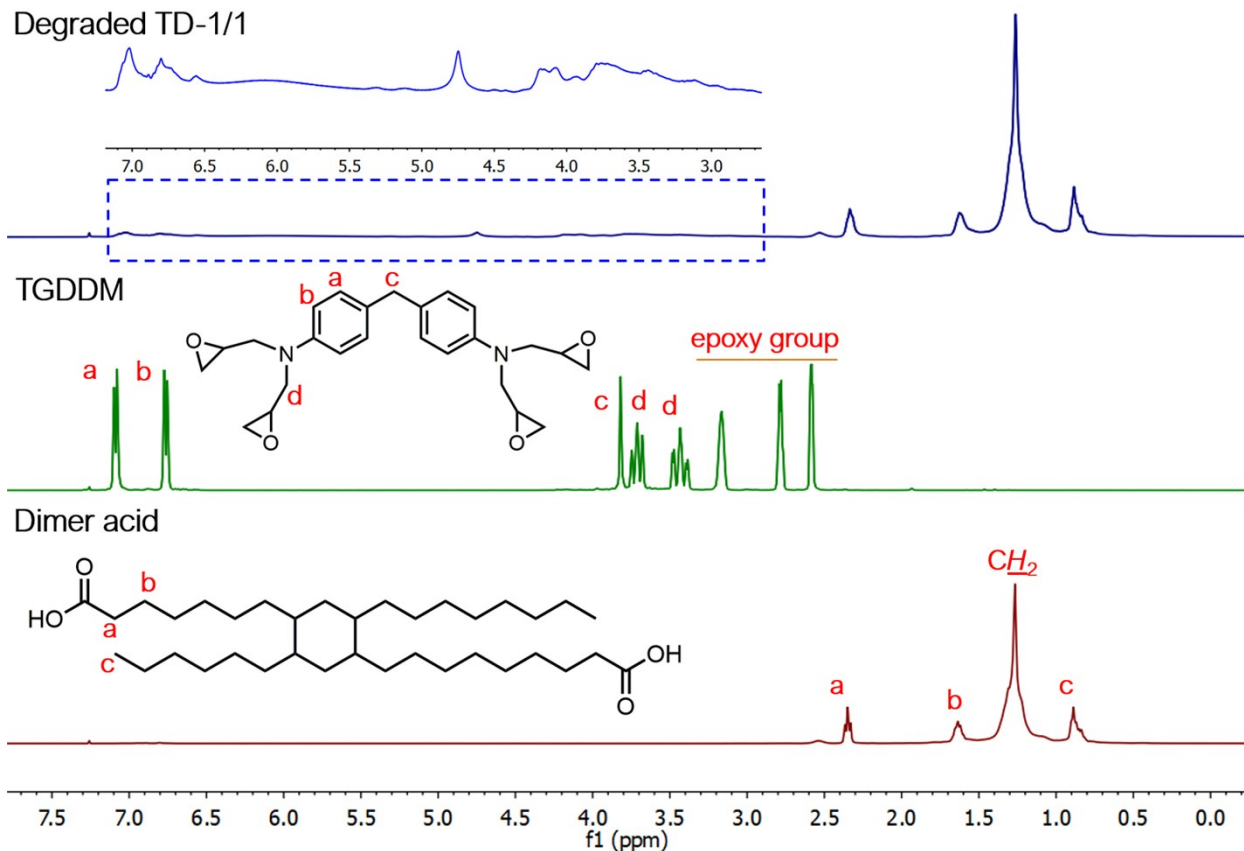
**Figure S5** The degraded polymer solution after degradation in 0.5 M NaOH solution for 5 h.



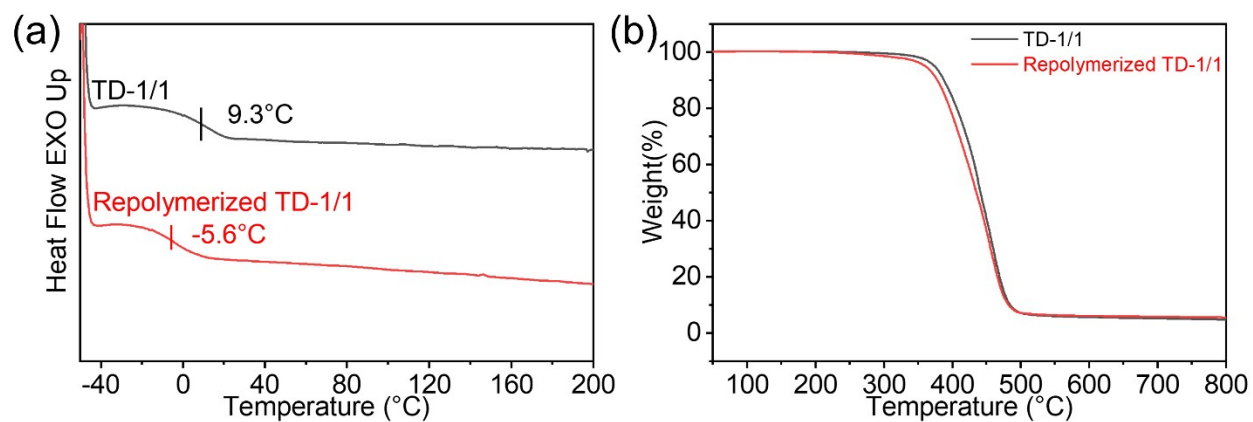
**Figure S6** Viscosity vs temperature of the decomposed TD-1/1. The heating rate was 3 °C min<sup>-1</sup>, and the shear rate was 1 s<sup>-1</sup>.



**Figure S7** GPC curve of the decomposed TD-1/1. The degradation reaction was performed in pure water at 190 °C for 5 h. The peak molecular weights are labeled in the curve.



**Figure S8** <sup>1</sup>H-NMR spectra of the degraded TD-1/1, TGDDM, and dimer acid.



**Figure S9** (a) DSC and (b) TGA heating curves of TD-1/1 and the repolymerized TD-1/1 (rTD-1/1).