Supplementary Material

Investigation on properties and structures of resveratrol-derived epoxy thermosets cured with active ester

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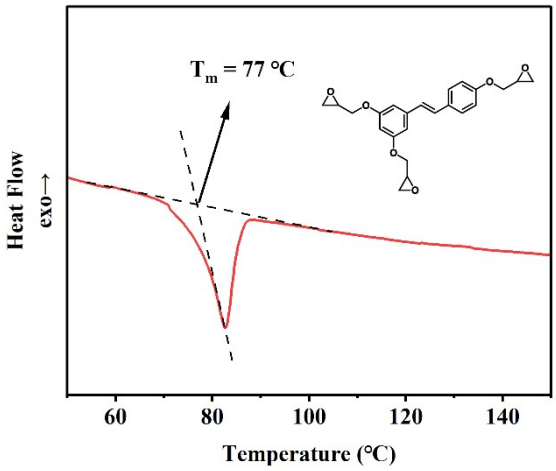

Figure S1 Non-isothermal DSC curve of REP.

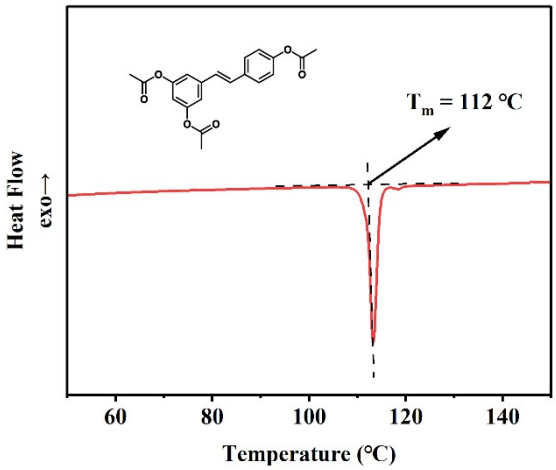

Figure S2 Non-isothermal DSC curve of TAR .

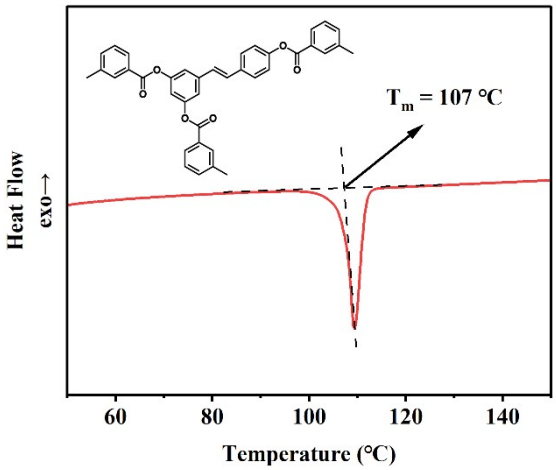

Figure S3 Non-isothermal DSC curve of TTR .

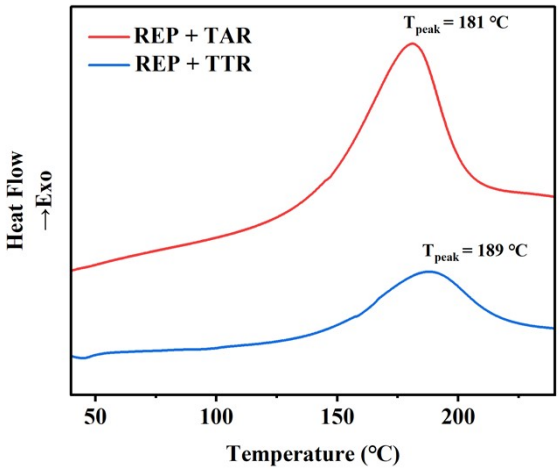

Figure S4 Non-isothermal DSC curves of uncured REP/TAR mixture and REP/TTR mixture.

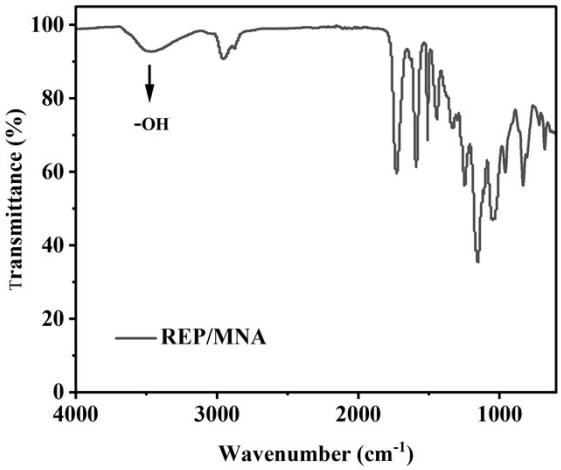

Figure S5 FTIR spectra of REP/MNA

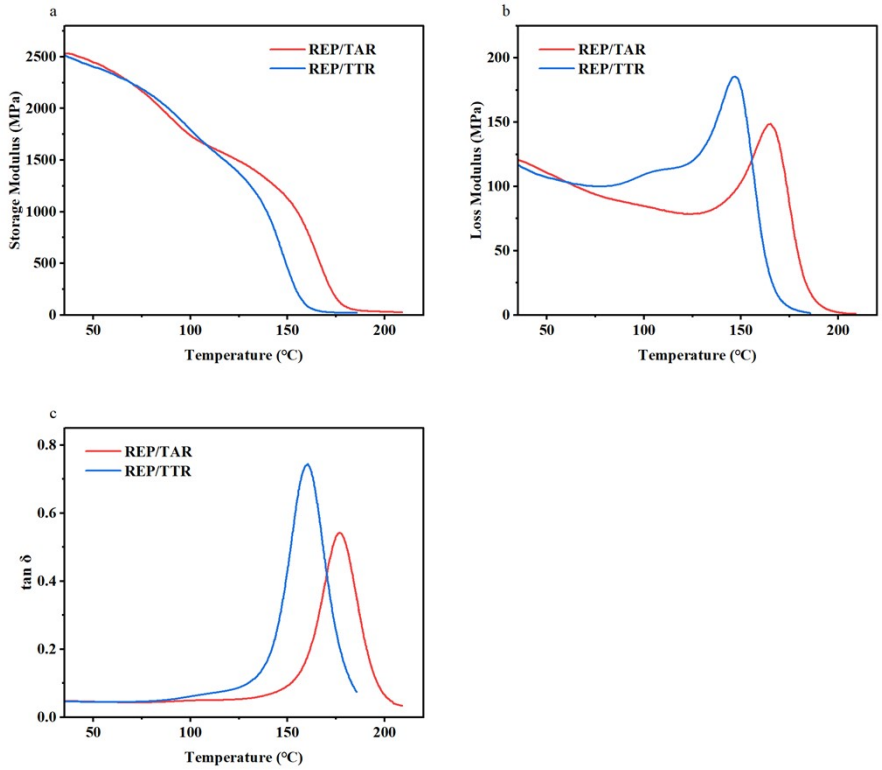

Figure S6 (a) Storage Modulus, (b) loss modulus, (c) tanδ curves of the epoxy thermosets from DMA tset.

Table S1 DMA data of the epoxy thermosets.

Sample	T_g (K)	E' (MPa) (T_g + 25)	v_e (mol/m^3)
REP/TAR	450	30.5	2574
REP/TTR	433	20.8	1820

The crosslink density (v_e) can be calculated by the equation: $E' = 3RTv_e$.
$T = T_g + 25$, $R = 8.314$

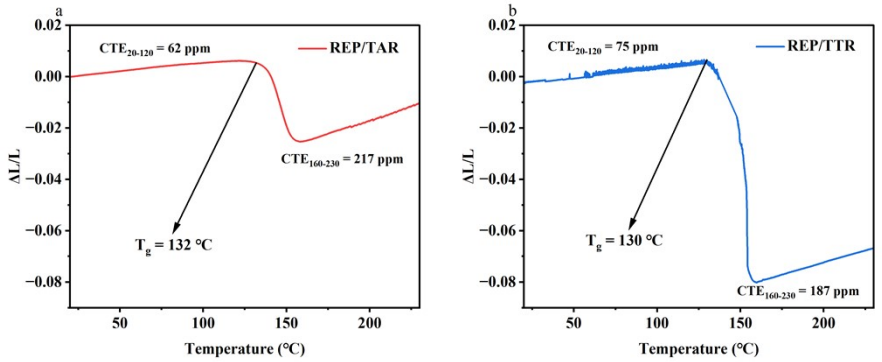

Figure S7 Thermal expansion curves of (a) REP/TAR and (b) REP/TTR from TMA test.

Table S2 Examples of conversion of vertical coordinate (REP/TAR).

Original coordinate (TG)		Conversed coordinate	
Temperature (˚C)	Mass (%)	Temperature (˚C)	Molecular weight of one-part
30	100	30	750
…	…	…	…
473	76.4	473	573
…	…	…	…
428	60	428	450
…	…	…	...

Defined the thermosets obtained by reacting 1 mol epoxy and 1 mol hardener as one part.
REP/TAR = 1 mol REP + 1 mol TAR = 396 + 354 = 750
REP/TTR = 1 mol REP + 1 mol TTR = 396 + 582 = 978
Conversion process: Molecular weight of one-part = Mass × 750(978)

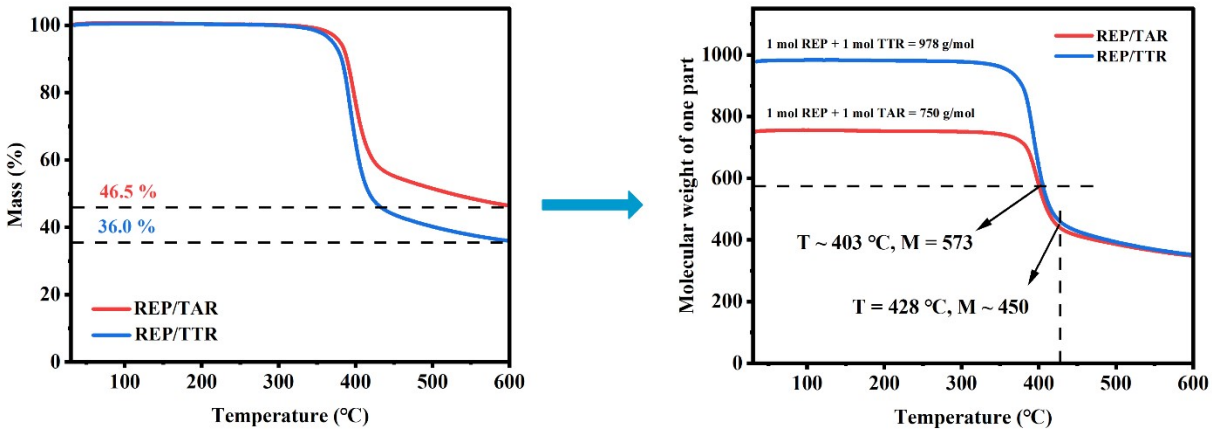

Figure S8 TG curves and Conversed curves of epoxy thermosets.

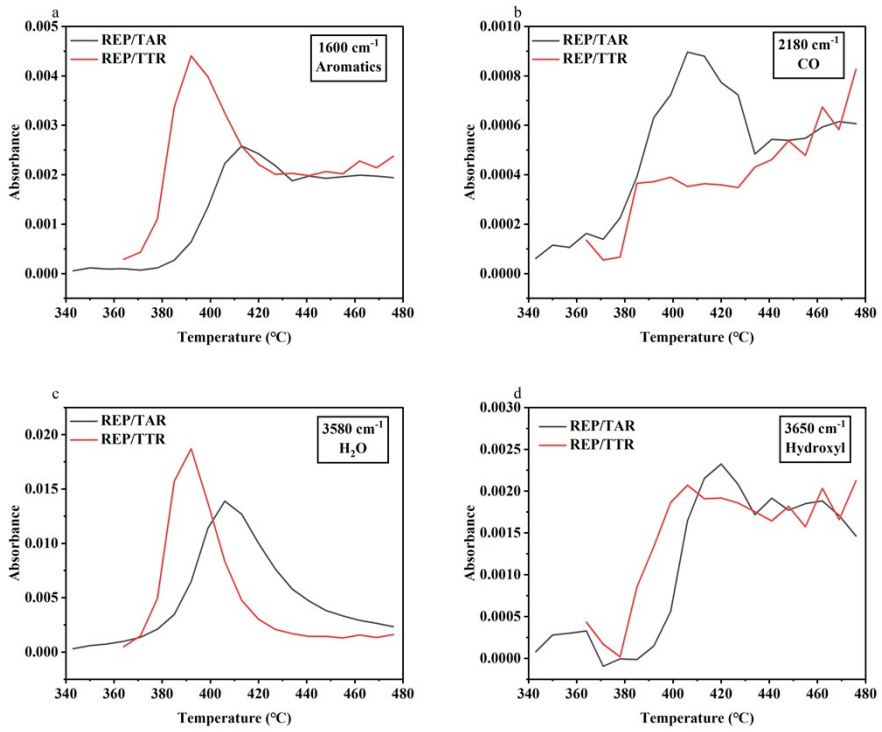

Figure S9 Absorbance intensities of characteristic peaks (at (a) 1600 cm^{-1}; (b) 2180 cm^{-1}; (c) 3580 cm^{-1}; (d) 3650 cm^{-1}) versus temperature curves of epoxy thermosets from TG-IR test.

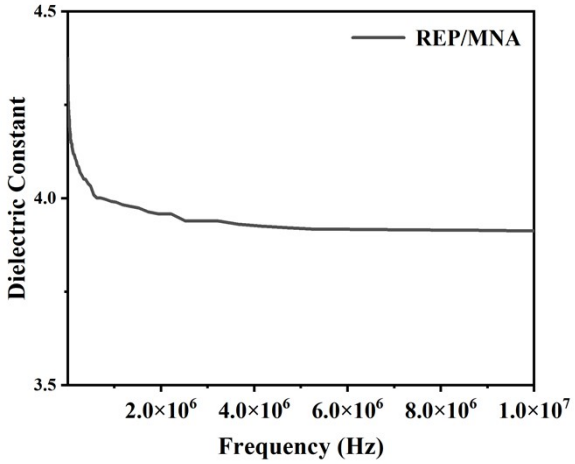

Figure S10 Dielectric constant of REP/MNA.

Table S3 Water absorptions rate of REP/TAR, REP/TTR and REP/MNA

	24 h	48 h	72 h	96 h	120 h
REP/TAR	0.22 %	0.39 %	0.55 %	0.66 %	0.72 %
REP/TTR	0.16 %	0.27 %	0.32 %	0.35 %	0.35 %
REP/MNA	0.57 %	0.87 %	1.03 %	1.20 %	1.30 %

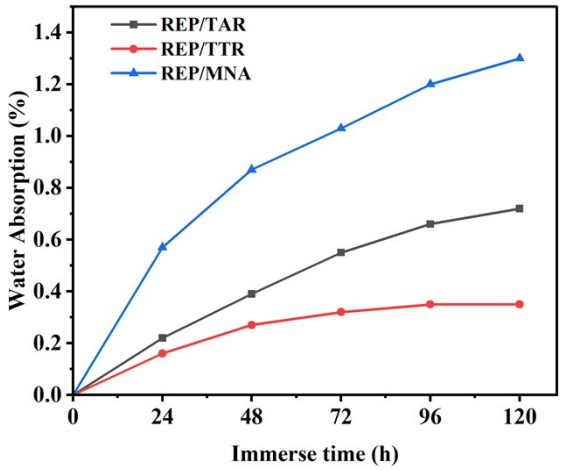

Figure S11 Water absorptions rate of REP/TAR, REP/TTR and REP/MNA.

Preparation of REP/MNA:
Formulation: 3.96 g REP and 2.67 g methyl nadic anhydride (MNA)
Curing condition: 110˚C/2h + 140 ˚C/2h + 180˚C/1h

REP and MNA were heated to melt and mixed with vigorous stirring for 10 min. Then, 0.5 wt% DMP-30 was added to the mixture as a cure accelerator, while stirring for 5 min. The mixtures were degassed under vacuum at 100 °C for 10 min, poured into the mold and cured at the preset temperature and time.