

**High-performance fully bio-based dynamic covalent supramolecular epoxy resin:
synthesis and properties**

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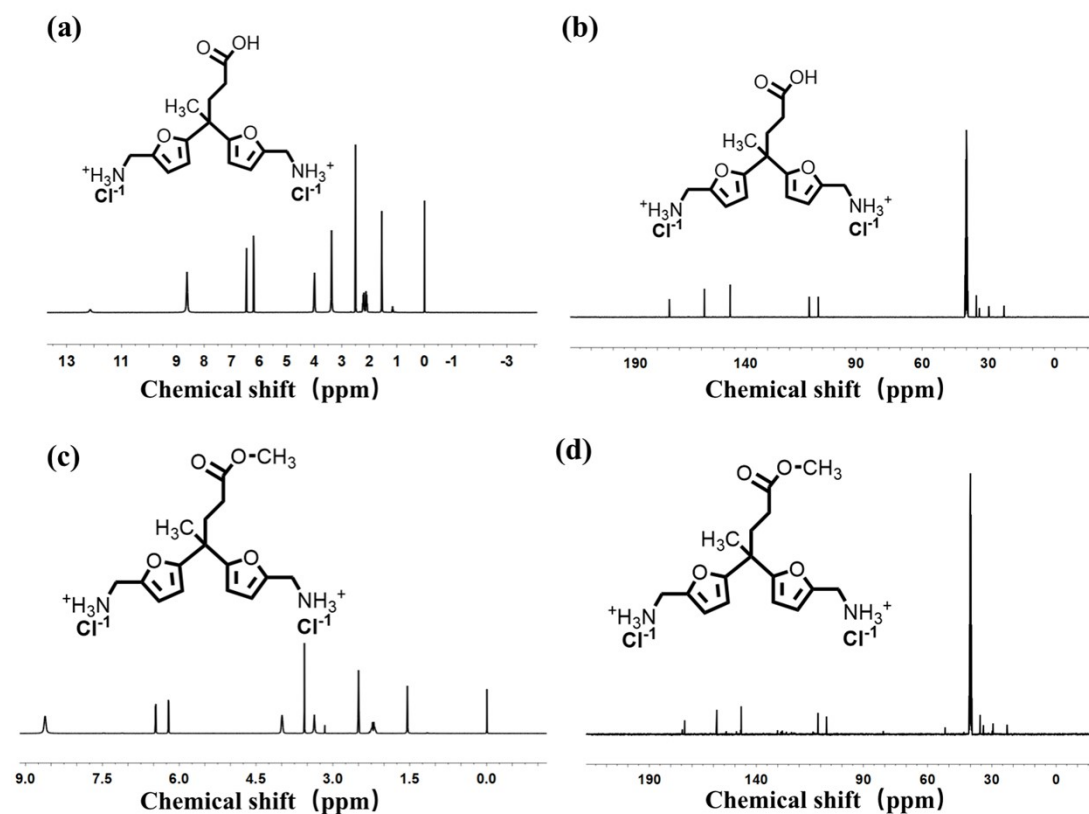


Fig. S1. ¹H NMR(a) and ¹³C NMR(b) spectra of 4,4'-Bis(5-amino-2-furano)valerate hydrochloride. ¹H NMR(c) and ¹³C NMR(d) spectra of 4,4'-Bis(5-amino-2-furano)valerate methyl ester hydrochloride.

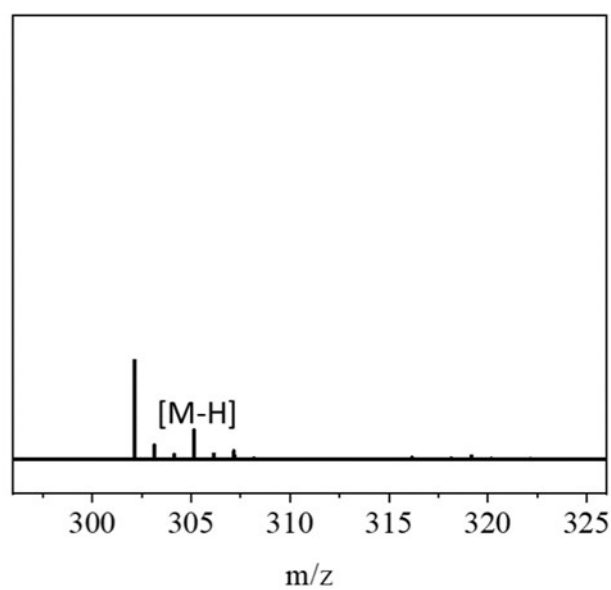


Fig. S2. TOF-MS spectrum of FDE.

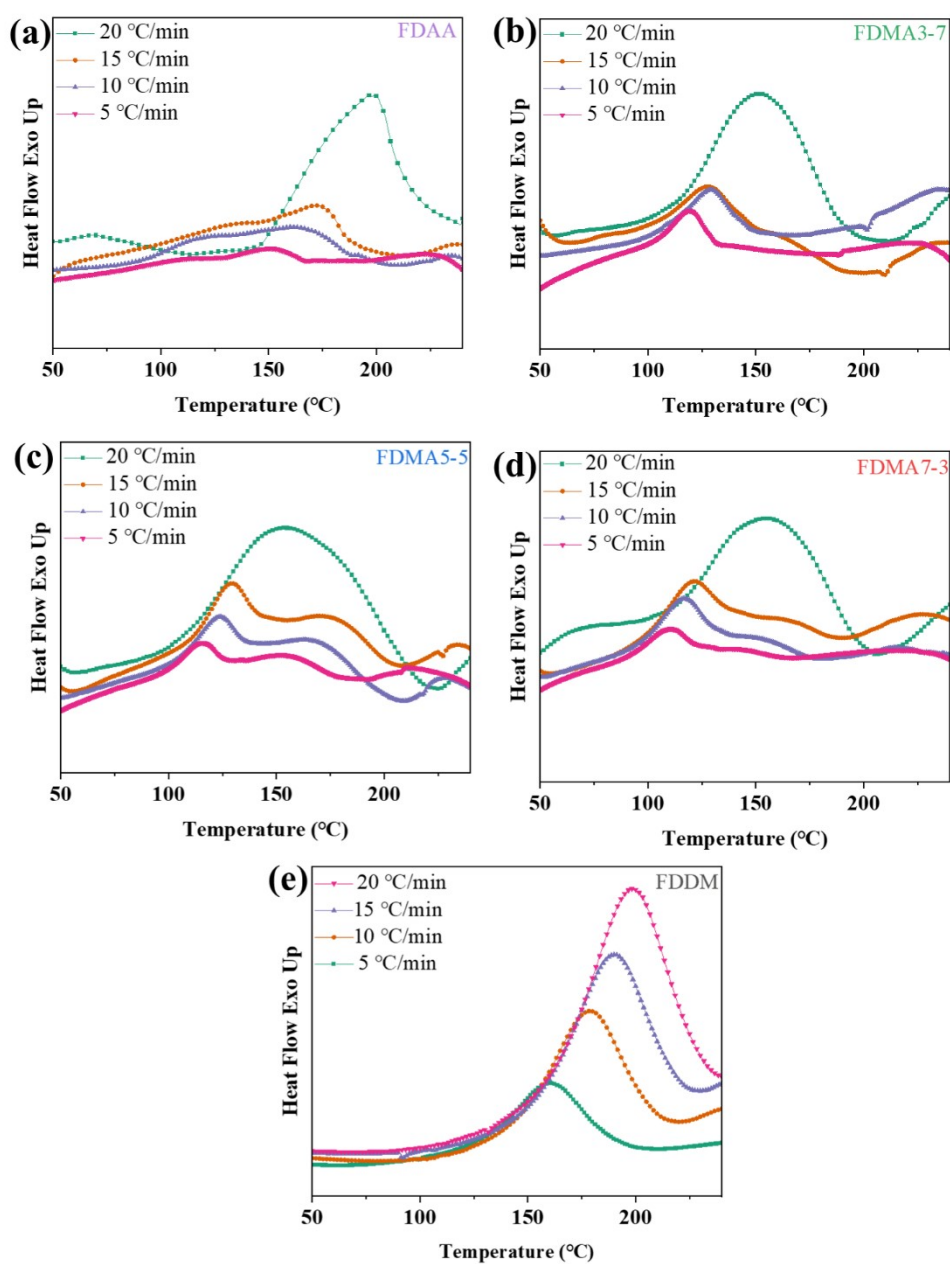


Fig. S3. (a) Non-isothermal DSC thermographs of FDAA with heating rates of 5, 10, 15, 20 K min⁻¹. (b) Non-isothermal DSC thermographs of FDMA3-7 with heating rates of 5, 10, 15, 20 K min⁻¹. (c) Non-isothermal DSC thermographs of FDMA5-5 with heating rates of 5, 10, 15, 20 K min⁻¹. (d) Non-isothermal DSC thermographs of FDMA7-3 with heating rates of 5, 10, 15, 20 K min⁻¹. (e) Non-isothermal DSC thermographs of FDDM with heating rates of 5, 10, 15, 20 K min⁻¹.

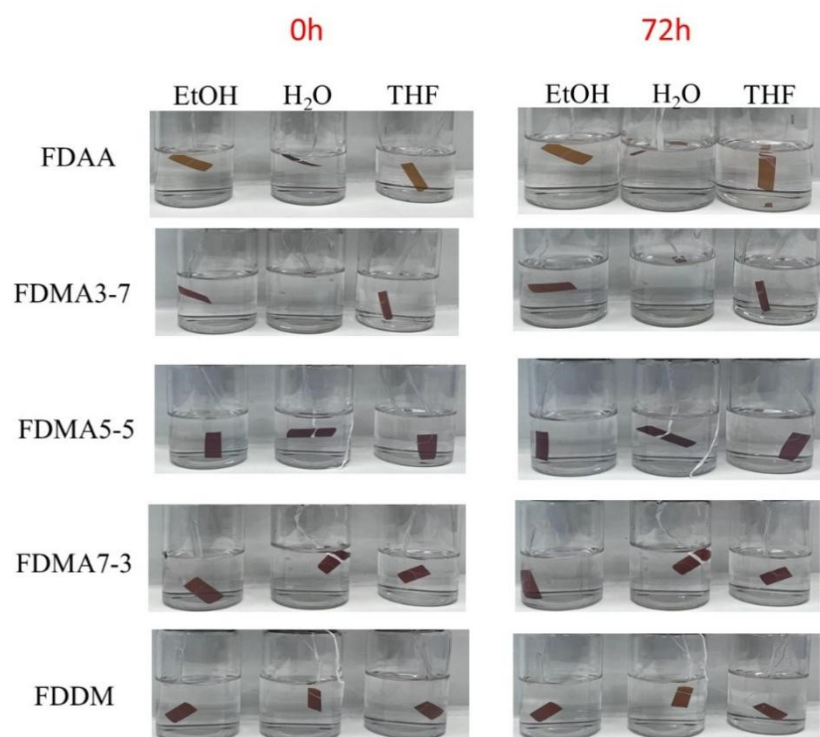


Fig. S4. Photographs of resins swelling in EtOH, H₂O, THF at room temperature for 72h.

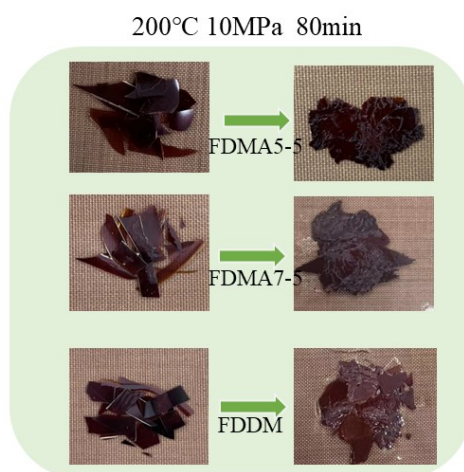


Fig. S5. Illustration of reprocessing of FDMA5-5, FDMA7-3 and FDDM.

Fig. S7. TOF-MS spectrum of degradation products of resin in ethylene glycol.

Greener solvents were also employed to replace non-green solvents in the synthesis process. For instance, acetone was used as a substitute for chloroform in the purification of FDE and FDEP, ultimately yielding the desired product, FDEP. Similarly, methyl isobutyl ketone replaced DMF in the curing process, resulting in the cured product, FDAA.

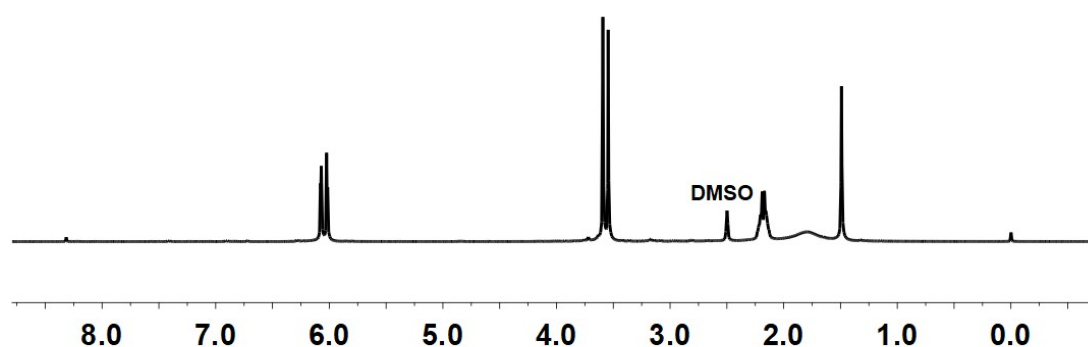


Fig. S8. NMR proton spectrum of FDE purified using acetone

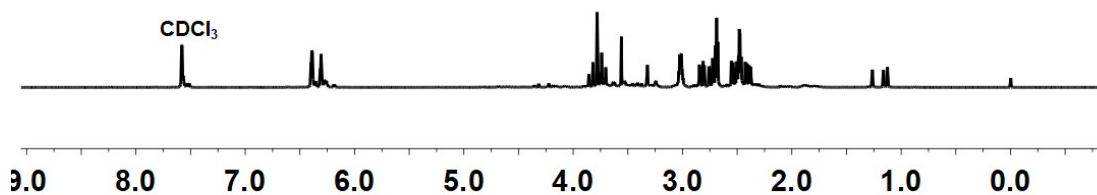


Fig. S9. NMR proton spectrum of FDEP purified using acetone



Fig. S10. Methyl isobutyl ketone used as a curing solvent to obtain FDAA samples.

Table S1. Epoxy resin ingredient list.

Name	FDAA	FDMA3-7	FDMA5-5	FDMA7-3	FDDM
Epoxy group of FDEP	10	10	10	10	10
Active hydrogen group of FDCA	10	7	5	3	0
Active hydrogen group of FDDM	0	3	5	7	10

Table S2. Date of Non-isothermal curing curve.

Samples	β ($^{\circ}\text{Cmin}^{-1}$)	T_{onset} ($^{\circ}\text{C}$)	T_p ($^{\circ}\text{C}$)	T_{end} ($^{\circ}\text{C}$)
FDAA	5	146.2	198.3	240.2
	10	126.5	164.6	202.3
	15	138.4	172.6	217.1
	20	146.4	198.5	240.2
FDMA3-7	5	84.2	118.5	136.6
	10	85.3	128.5	160.4
	15	91.6	128.6	170.5
	20	103.2	151.4	203.6
FDMA5-5	5	80.2	114.4	131.2
	10	85.5	123.6	140.2
	15	90.2	130.6	150.2
	20	100.1	155.7	218.8
FDMA7-3	5	75.3	110.4	133.6
	10	80.4	116.4	141.5
	15	92.5	122.6	158.2
	20	101.2	155.6	200.4
FDDM	5	80.3	161.5	200.2

10	99.3	179.3	213.3
15	102.3	190.4	223.4
20	112.4	198.6	237.6
