Supporting Information

3D Printing of Self-Healing, High Strength, and Reprocessable Thermoset

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Fig. S1 ¹H NMR spectrum of 2-((oxiran-2-ylmethoxy)methyl)furan (1).



Fig. S2 ¹H NMR spectrum of trifuran epoxy (TE).







Fig S4 a. ¹H NMR spectrum of TE and BMIO at a 1:1 ratio without any heat treatment; **b.** ¹H NMR spectrum of the same sample after heat treatment at 80 °C overnight.



Fig. S5 Superimposed ¹H NMR spectra of the sample in **Fig. S4b** after heating at 120 °C for 0 min, 30 min, 1hour, and 2 hours. The spectra are zoomed in on sections **a.** 6.96-6.98 ppm, **b.** 6.43-6.54 ppm, **c.** 5.01-5.10 ppm, and **d.** 2.84-3.08 ppm to demonstrate the changes in peak intensity during the retro Diels-Alder reaction.



Fig. S6 Cross-sectional images of **a**. molded, **b**. D1, **c**. D2, and **d**. D3 tensile samples. No air bubble is found in molded samples, while printed samples contain voids ranging from 50 to 200 μ m in diameter with cracks developed around them.



Fig. S7 The images of D3 cross-sectional slices. D3 samples were printed using 18 gauge nozzles and the corresponding printed filaments had a diameter of $\sim 1 \text{ mm}$. The dashed lines mark the estimated boundries between deposited filaments, with an area of $1 \text{ mm} \times 1 \text{ mm}$ for each divided section.



Fig. S8 Dimensions of the pre-cracked single-edge-notch bending (SENB) samples.



Fig. S9 Representative curves of the a. molded, b. S1, c.S2, and d. S3 after each healing cycle.

Table S1 Self-healing efficiencies of molded, S1, S2, and S3 for the first, second, and third healing.

SENB Samples	First Healing (%)	Second Healing (%)	Third Healing (%)
Molded	84.59 ± 20.06	74.90 ± 8.65	79.23 ± 9.92
S 1	90.44 ± 12.30	89.48 ± 7.76	73.22 ± 6.85
S2	86.66 ± 7.53	84.42 ± 9.84	77.69 ± 6.40
S3	87.13 ± 8.79	79.07 ± 7.17	77.24 ± 10.93