

Recyclable Epoxy Thermoset Shape Memory Polymer with High Stress and Energy Output via Facile UV-Curing

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SUPPORTING INFORMATION

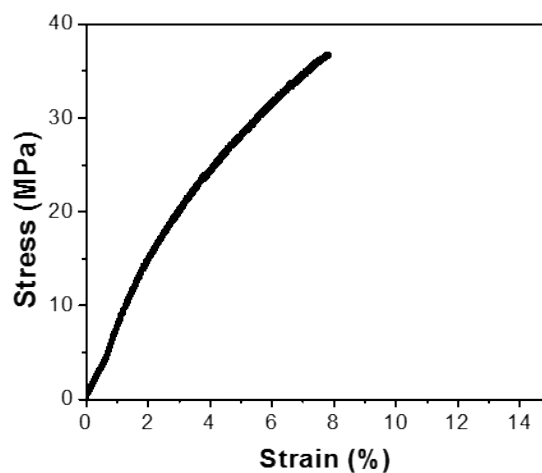


Figure S1. Typical plot of tensile stress vs. strain of the UV-cured thermoset VSMP specimen after 80 s curing time.

Table S1. Assignment of the characteristic peaks of the FT-IR spectrum in Figure 2.

Peak	Frequency	Attribution
a	1720	Ester carbonyl C=O stretch
b	1630	Double bond C=C
c	1506	Aromatic C=C stretch ¹
d	1452	Aromatic C=C stretch ¹
e	1243	Asymmetric C-O stretch ¹
f	1183	-O-CH ₂ -CH-O- stretch ²
g	1158	Saturated -CH ₂ -O- Stretch ³
h	1036	Symmetric C-O stretch ¹
i	829	Aliphatic C-O stretch

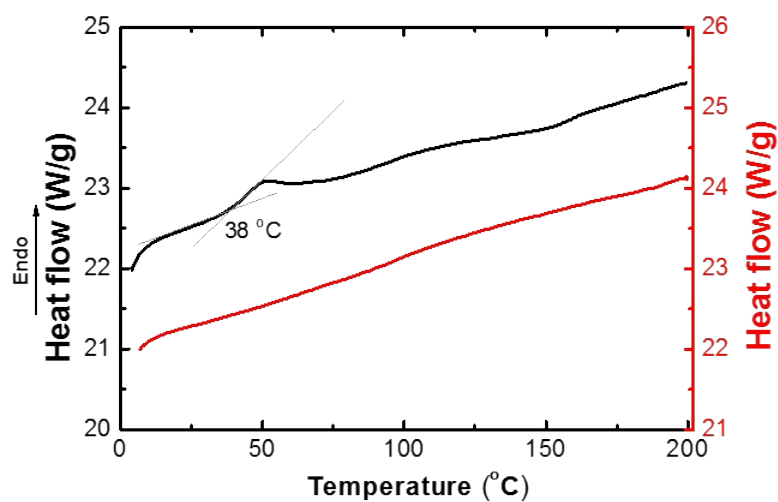


Figure S2. Thermograms of UV-cured thermoset VSMP. Black color represents the thermogram of the first heating cycle; Red color represents the thermogram of the second heating cycle.

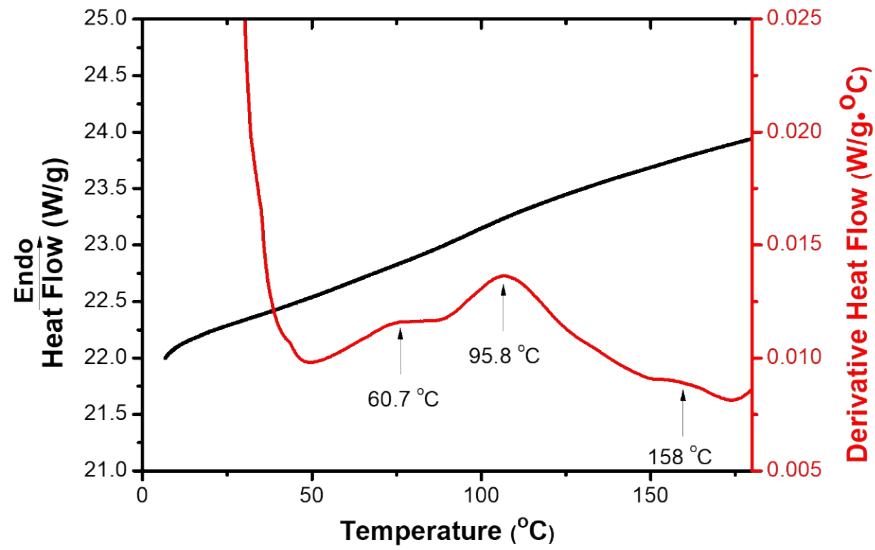


Figure S3. The first derivative of the heat flow with respect to temperature based on the second heating branch of the DSC test results

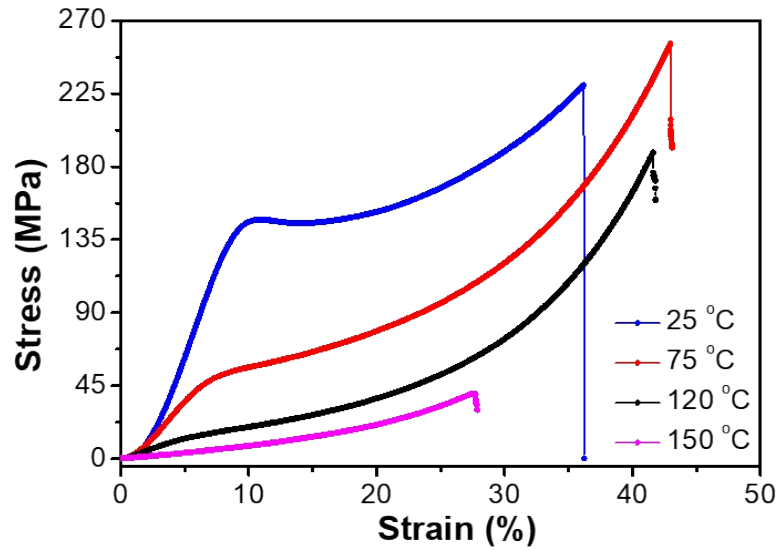


Figure S4. Representative compression behavior of the cylindrical VSMP specimens at room temperature and elevated temperatures.

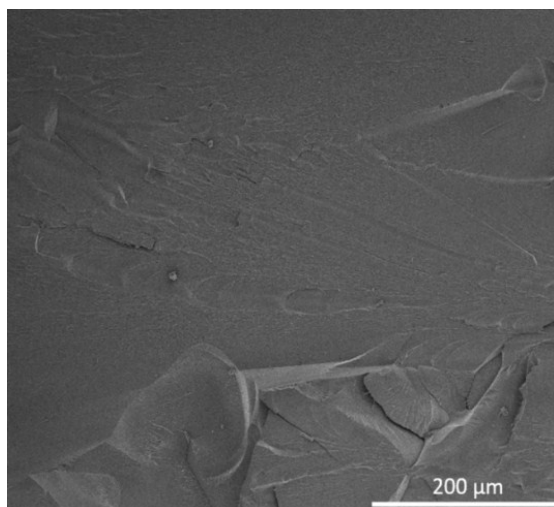


Figure S5. SEM image of the fracture surface of the UV-cured thermosets.

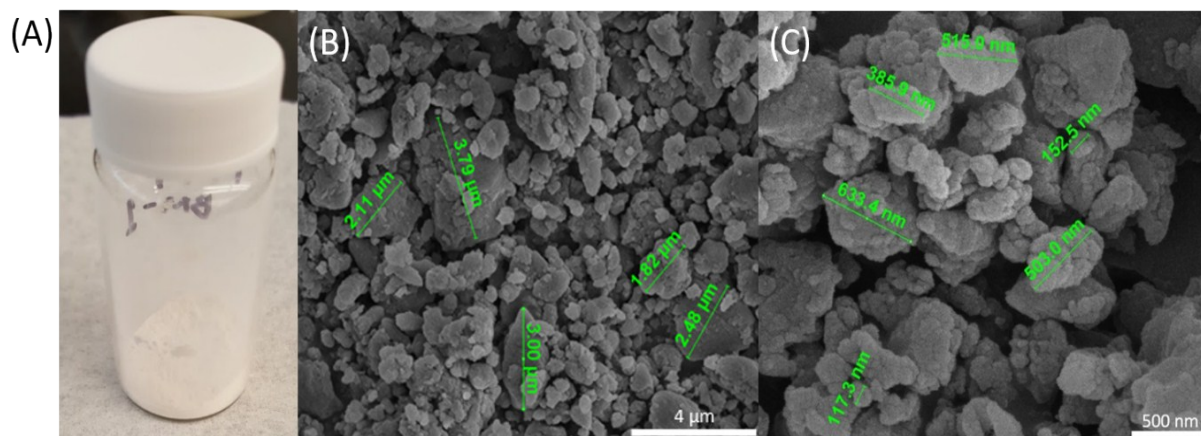


Figure S6. (A) Picture of the powder of the UV-cured thermoset ground by a ball milling machine. (B) SEM micrograph of the ground powder with powder size measured. (C) Zoom-in of the SEM micrograph of the ground powder.

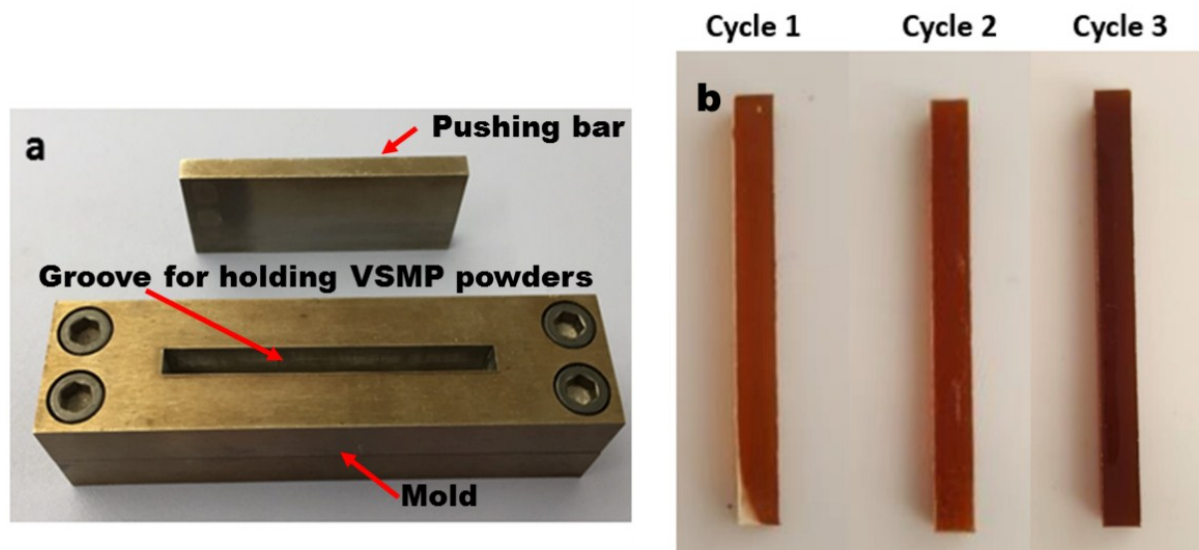
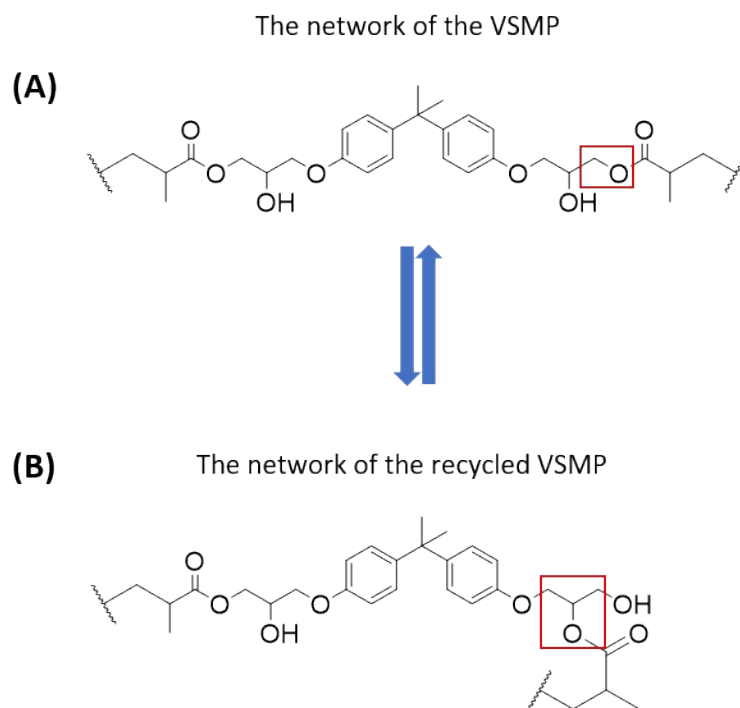


Figure S7. (A) The steel mold (bottom) and pushing bar (top) for preparing recycling VSMP specimens and (B) Representative pictures of the recycled thermoset specimen after the solid form recycling of the ground particles.



Scheme S1. (A) The transesterification reaction of the VSMP powders during the recycling process (150°C/14MPa/2h), (B) a possible network of the recycled VSMP.

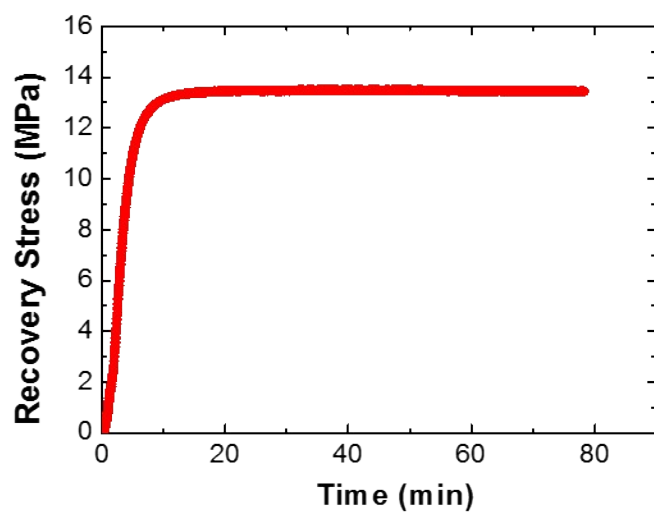


Figure S8. Representative profile of recovery stress vs. times measured by fully confining a cylindrical specimen (diameter = 12.28 mm, height = 19.20 mm) at 150 °C.

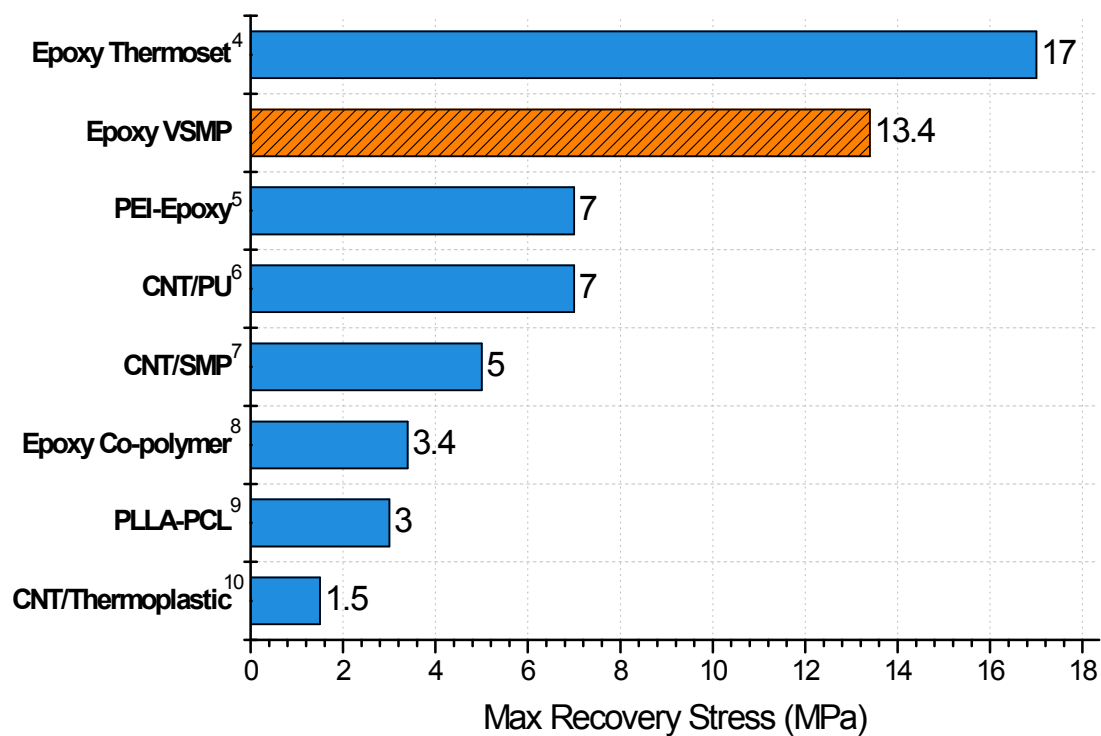


Figure S9. Reported maximum recovery stress of various shape memory polymers.

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