Electronic Supplementary Material (ESI) for Materials Advances.

Supplementary Information

AC Magnetorheology of Polymer Magnetic Composites

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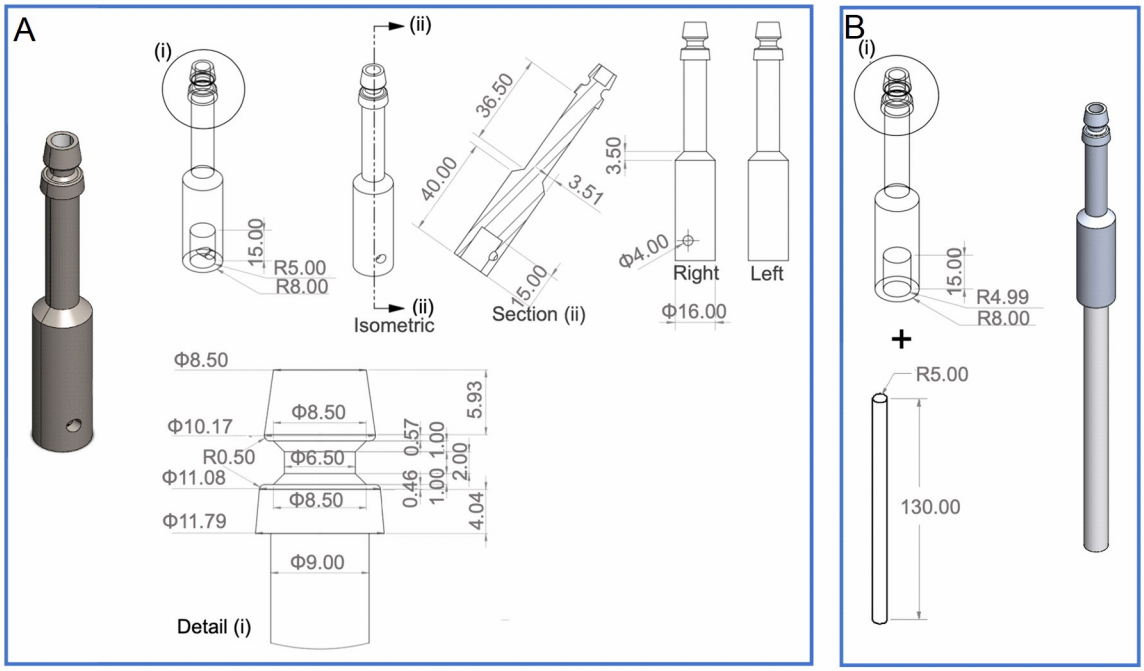

Fig. S1. Magnetorheometry measuring probe. (A) Stainless steel shaft used with disposable screwed-in probes of different materials; (B) Shrink-fitted stainless steel shaft with ceramic (MACOR) probe. All dimensions in millimetres.

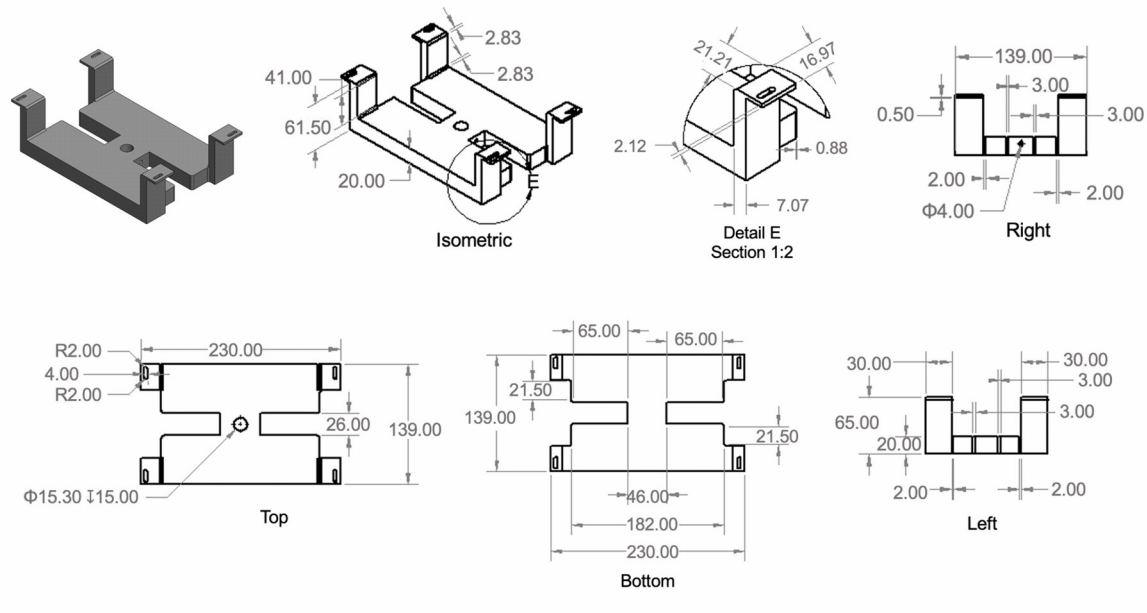

Fig. S2. CAD illustration of different views of base plate fixture (dimensions are in millimetres).

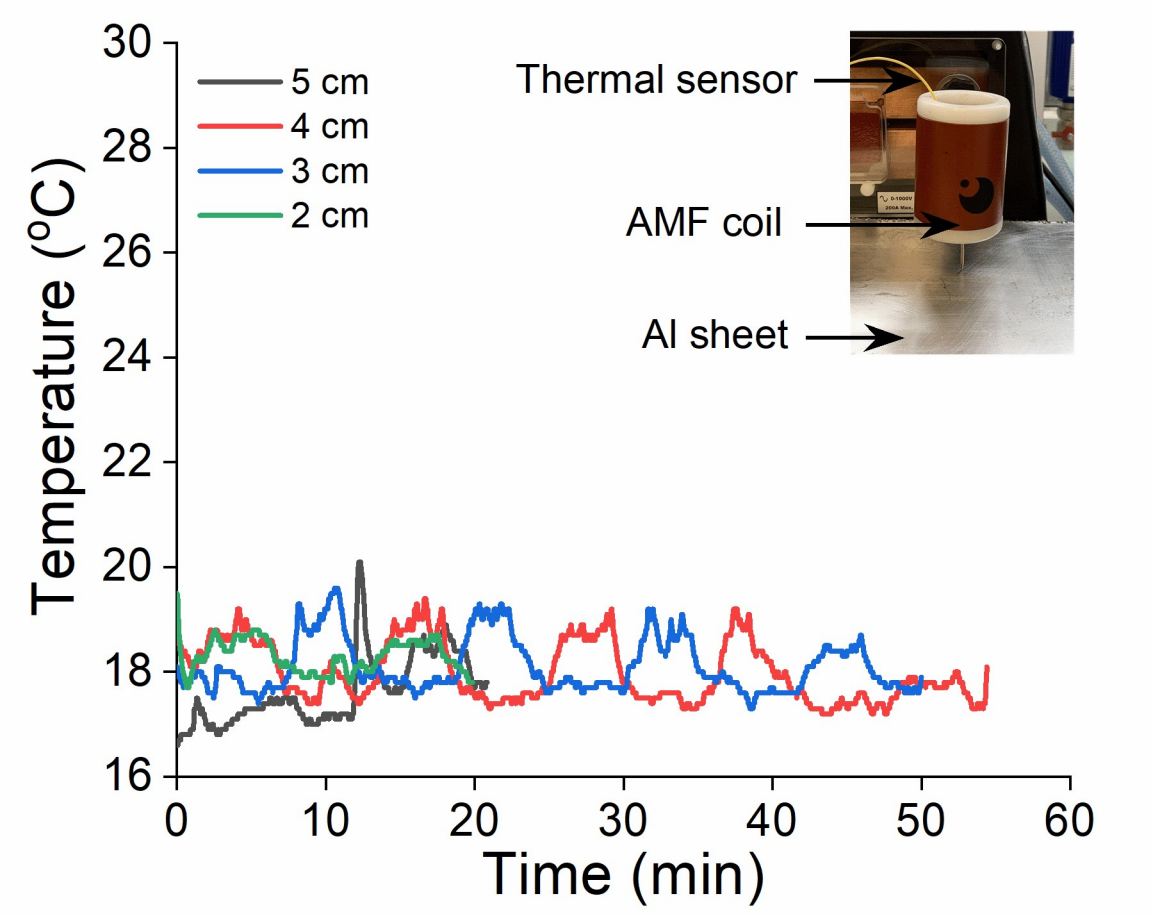

Fig. S3. AMF heating on aluminium sheet below S32 coil at 140 Oe.

Table 1. Material selection properties

Materials	Tensile strength (MPa)	Coefficient of thermal expansion (/ºC)	Thermal stability (ºC)
Ceramic	345*	90 x 10^{-7}	800
Glass reinforced plastic (GRP)	160	2-3 x 10^{-5}	260
Polytetrafluoro ethylene (PTFE)	25	13 x 10^{-5}	260
Acrylic	80	75 x 10^{-5}	160
Wood	78	5 x 10^{-6}	200-250
Stainless steel 304	564	17.3 x 10^{-6}	900

*Compressive strength

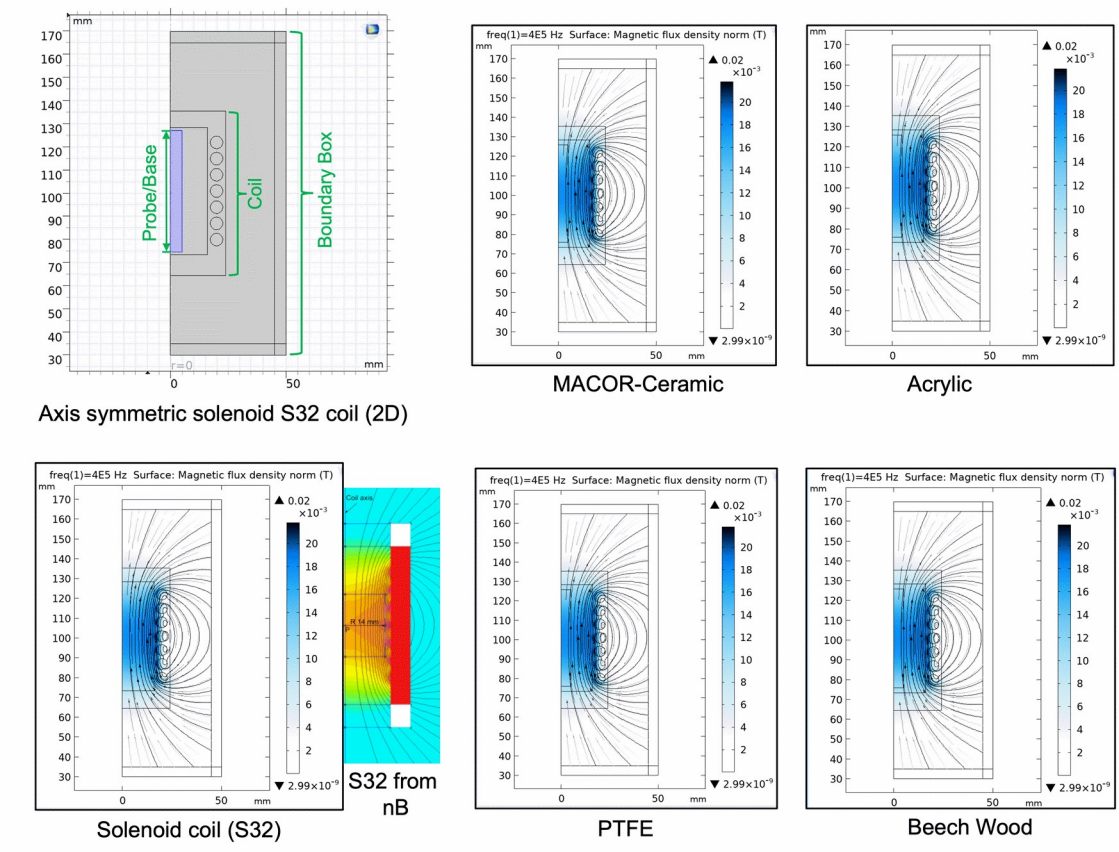

Fig. S4. COMSOL simulations to check the magnetic field attenuation in different materials.

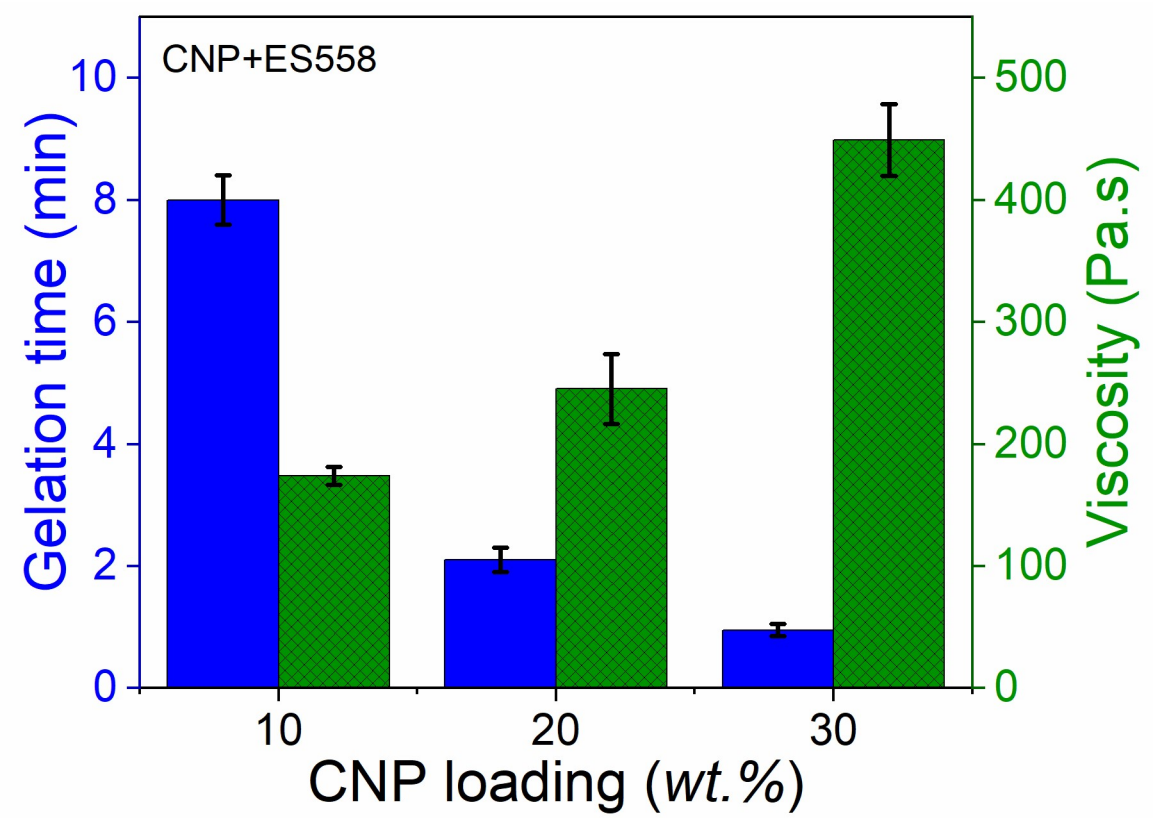

Fig. S5. Gelation time of the magnetoadhesives upon AMF application and apparent viscosity of pre-crosslinked magnetoadhesives

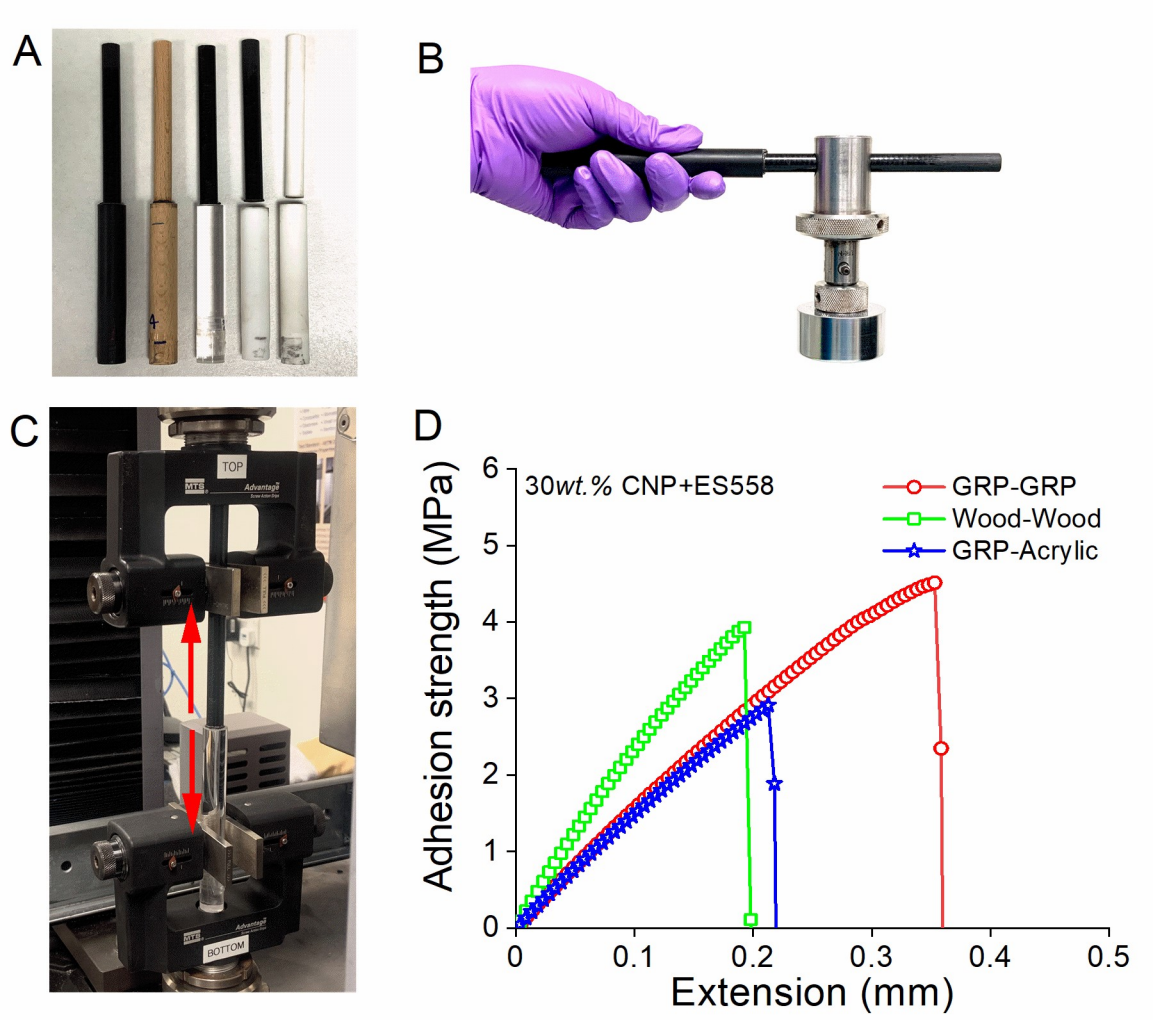

Fig. S6. Demonstration of magnetocured samples. **(A)** Different probe-base plates cured during real-time Magnetorheology (left to right: GRP probe-GRP base; Wood probe-Wood base; GRP probe-Acrylic base; GRP probe-PTFE base; Ceramic probe-Ceramic base); **(B)** GRP probe-GRP base cured during Magnetorheology hanging 5kg weight; **(C)** Tensile testing setup; **(D)** Lap shear adhesion strength of cured samples during AC Magnetorheology.