Supplementary Information

Polyurea interface structure with dual dynamic bonds endowing composites with synchronous self-healing and thermal conductivity

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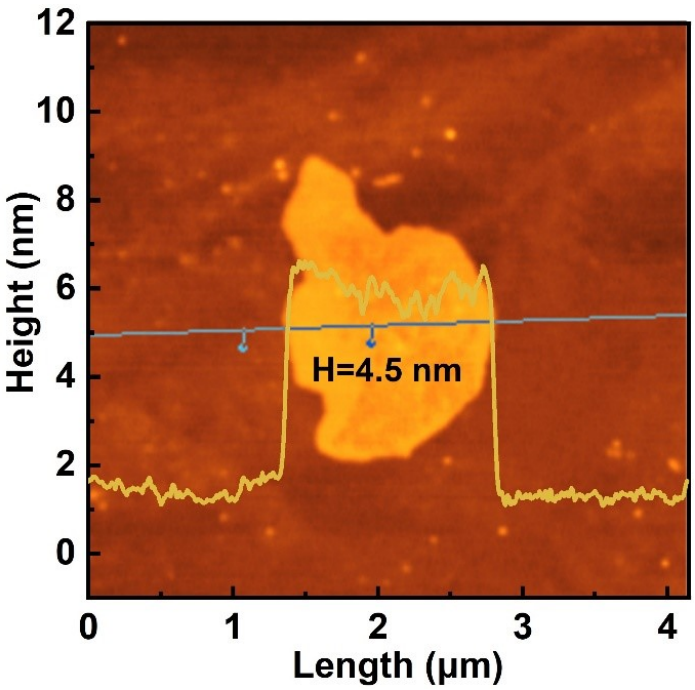

Fig. S1 AFM topographic image and curves of surface scale for GO.

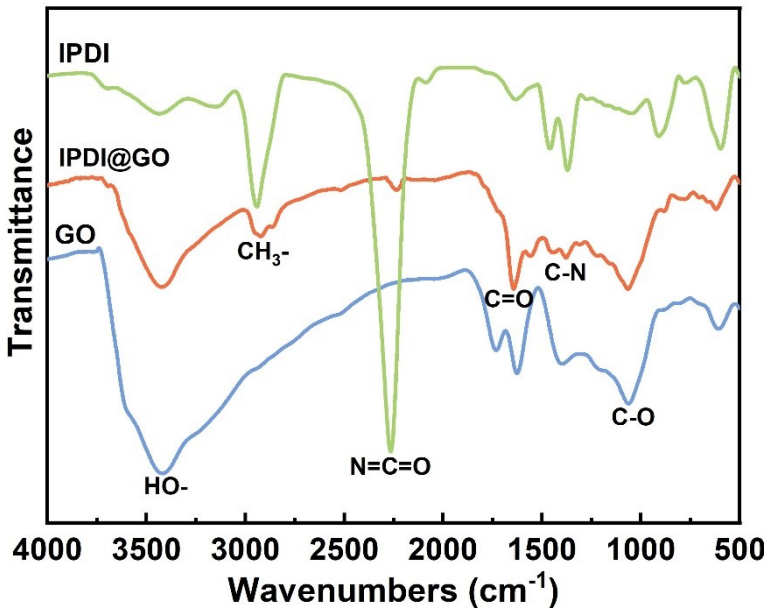

Fig. S2 FT-IR spectrum of GO, IPDI, and IPDI@GO.

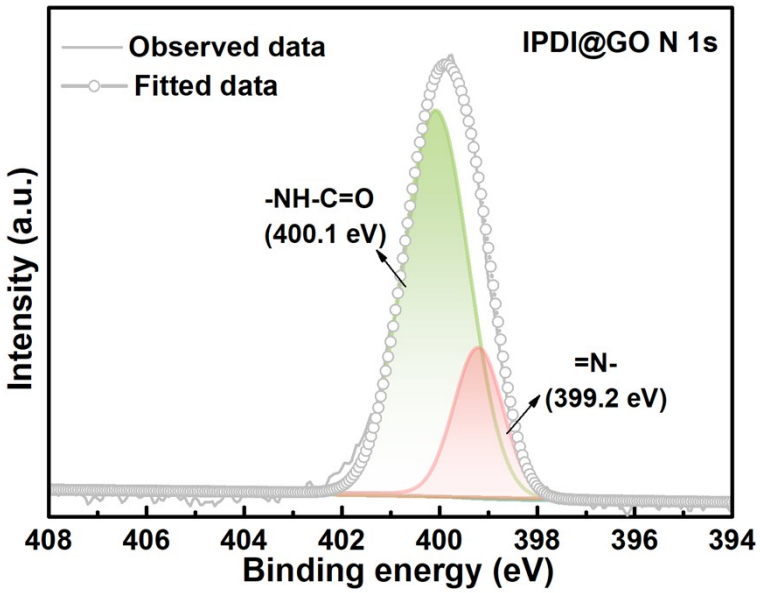

Fig. S3 XPS N1s spectra of IPDI@GO.

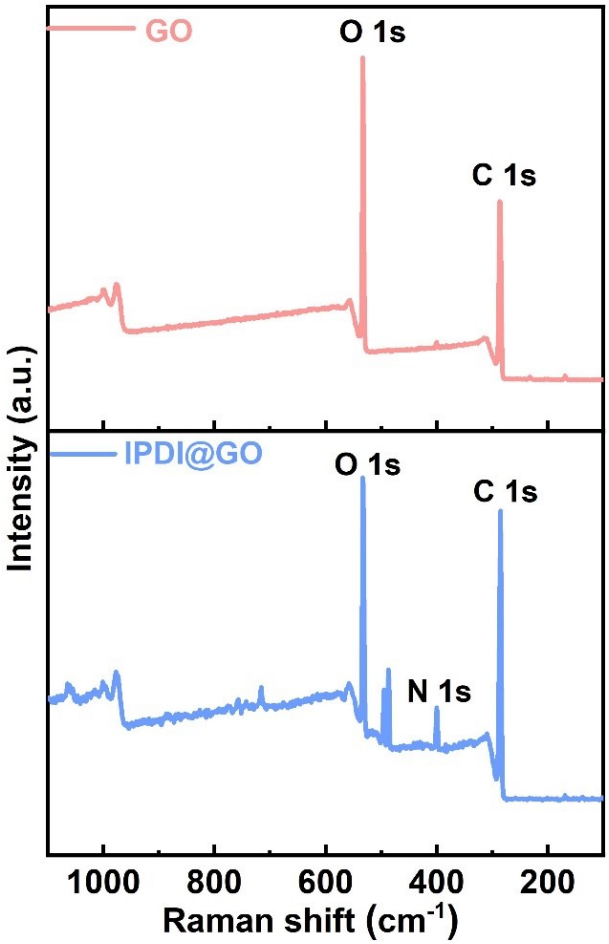

Fig. S4 XPS full spectrums of GO and IPDI@GO.

Table S1. Comparison of atomic concentration of C and N in GO and IPDI@GO by the XPS full spectrums.

Samples	Atomic concentration (%)		C/N atomic ration
	C 1s	N 1s	
GO	67.87	1.01	67.20
IPDI@GO	72.26	5.29	13.66

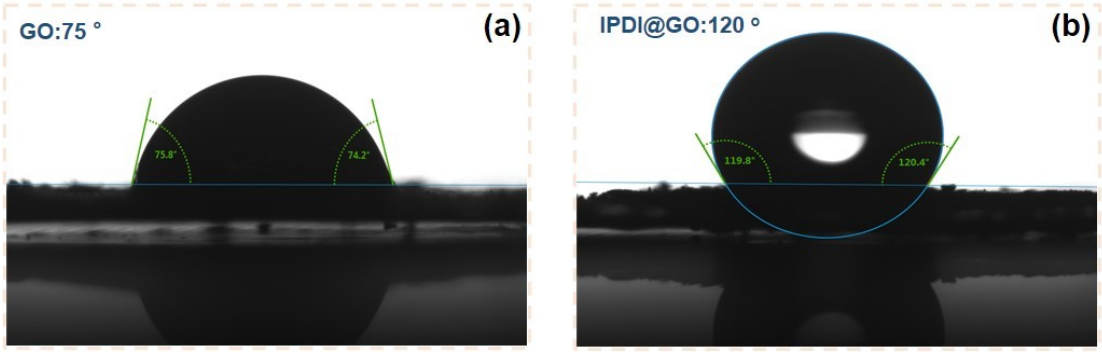

Fig. S5 Contact angles of H_2O on the surface of GO and IPDI@GO.

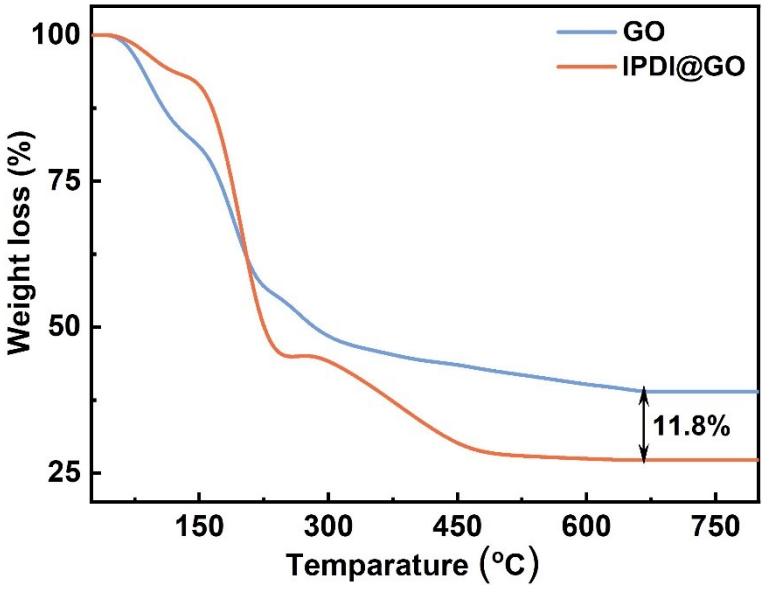

Fig. S6 TGA of GO and IPDI@GO.

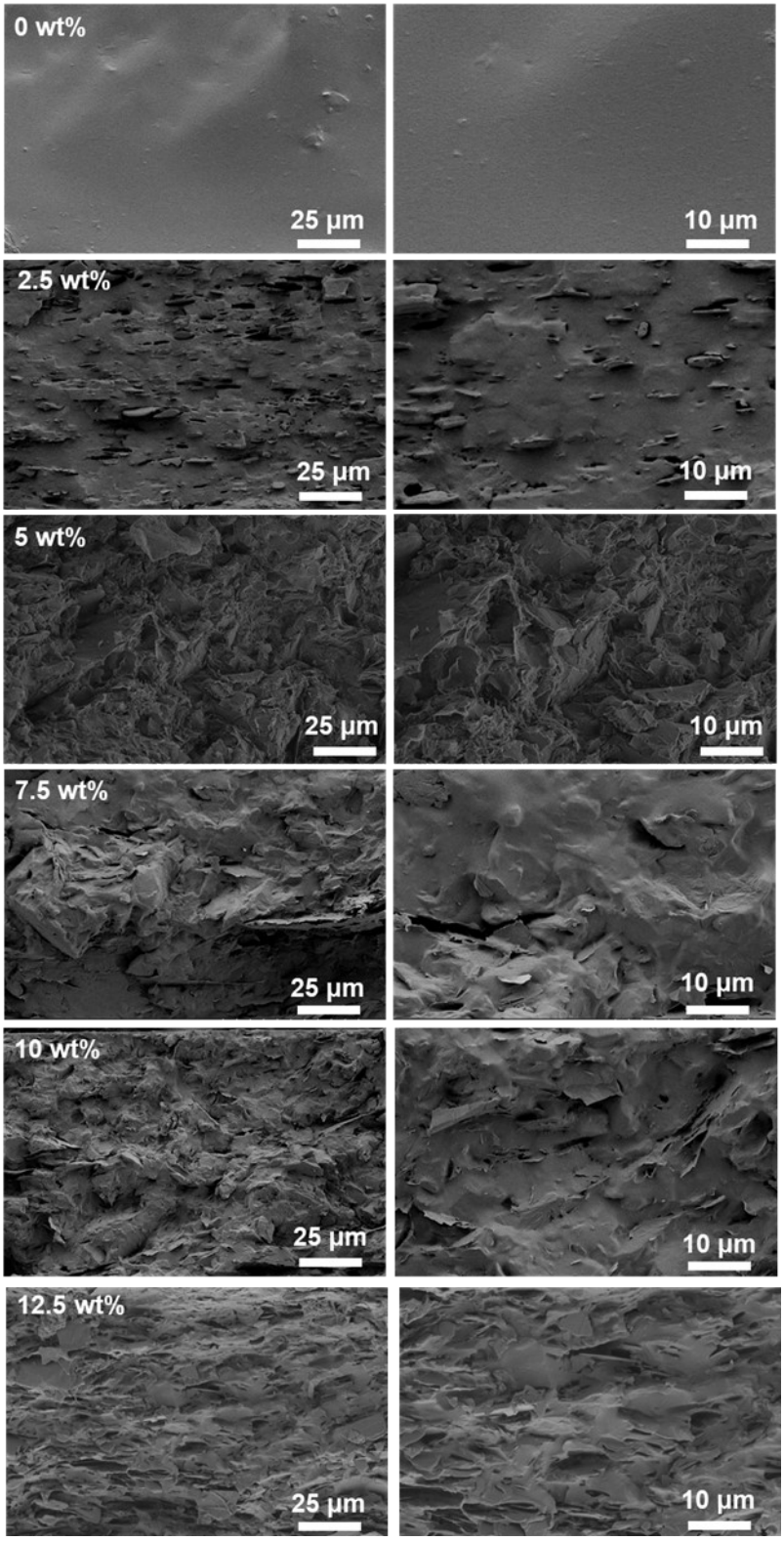

Fig.S7 Cross-sectional SEM images of IPDI@GO_x/D-PUA (x refers to the mass percentage of the filler content).

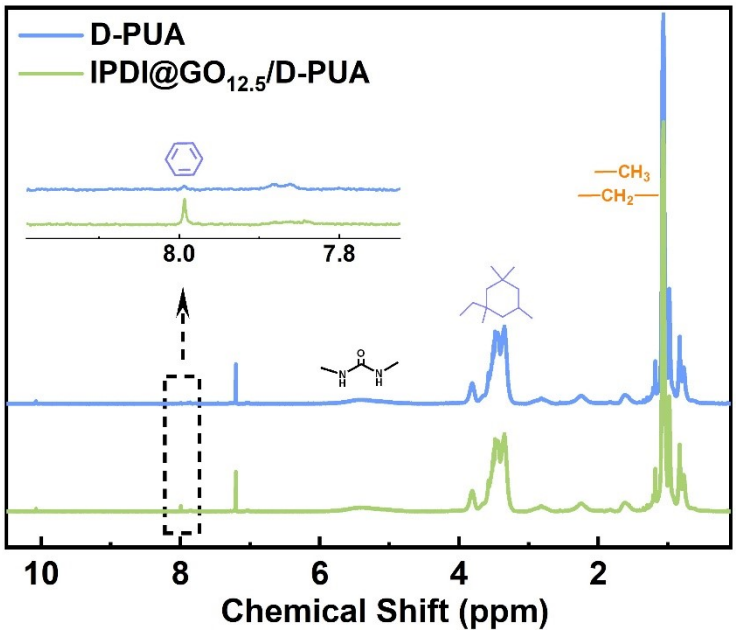

Fig. S8 ^{1}H NMR of D-PUA and IPDI@$GO_{12.5}$/D-PUA.

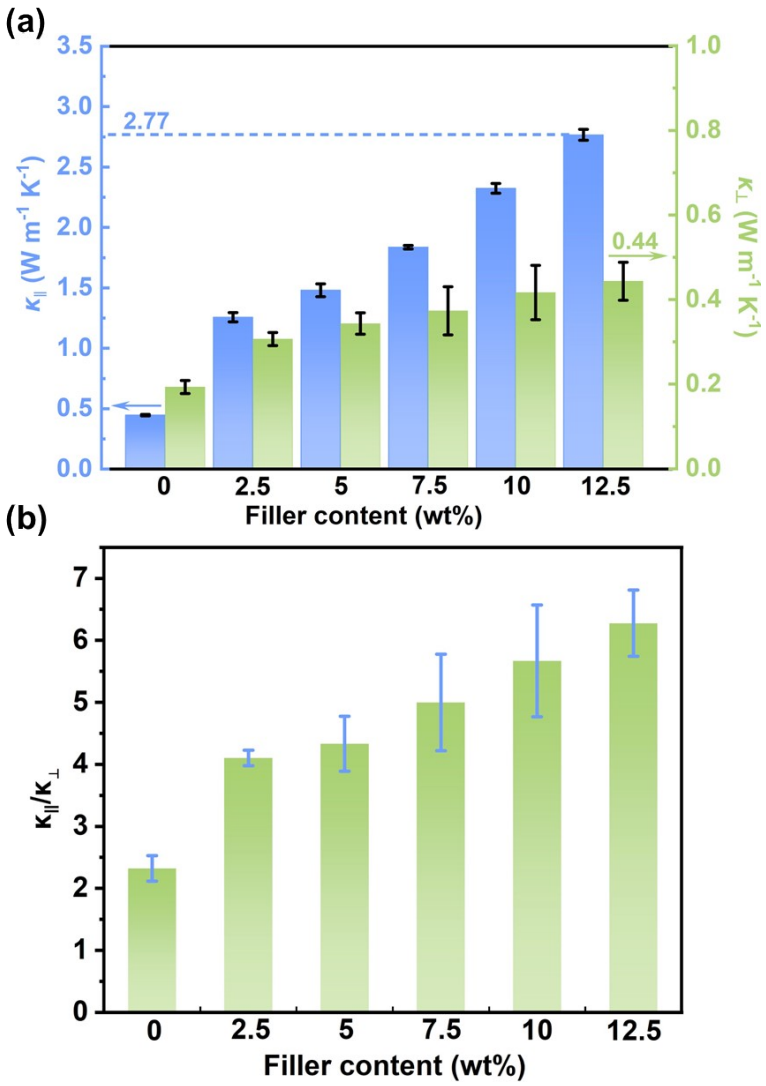

Fig.S9 (a) $\kappa_{\parallel}$ and $\kappa_{\perp}$, (b) Ratio of $\kappa_{\parallel}$ and $\kappa_{\perp}$ for IPDI@GO$_x$/D-PUA with different filler loading.

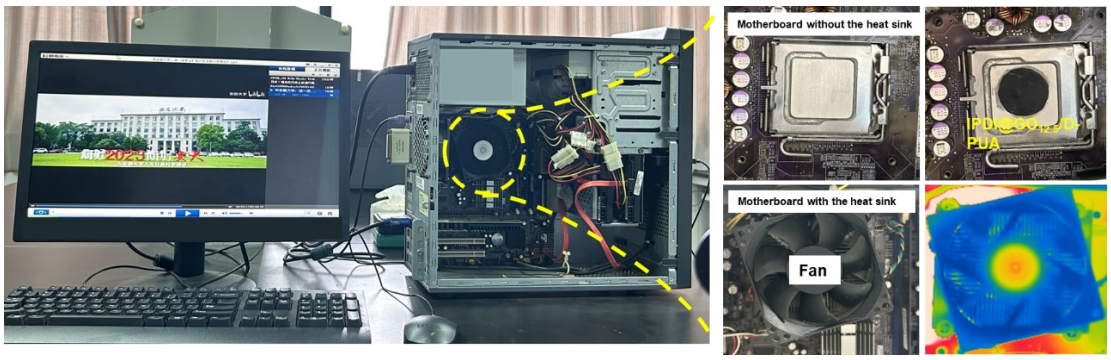

Fig. S10 Experimental setup for comparing the cooling efficiency between IPDI@$GO_{12.5}$/D-PUA and BGS-GP1000 based on desktop computer systems.

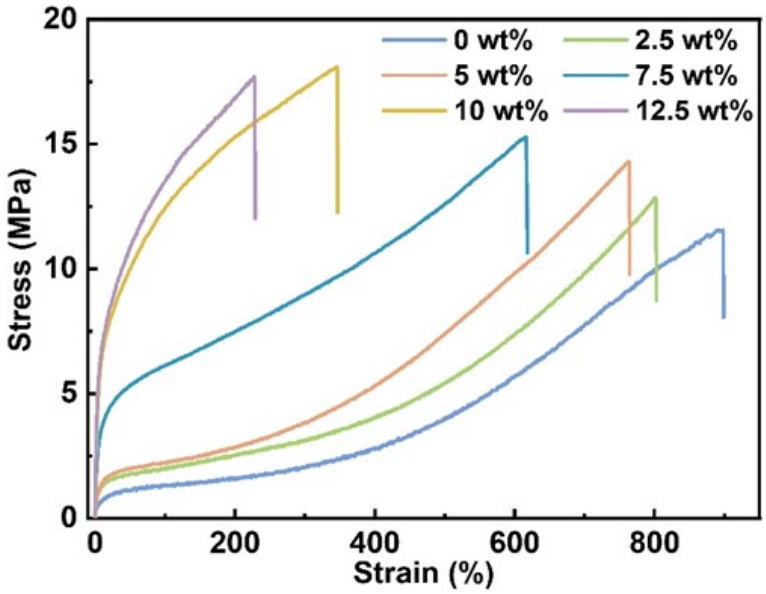

Fig. S11 Stress-strain curves of IPDI@GO_x/D-PUA with different filler loading.

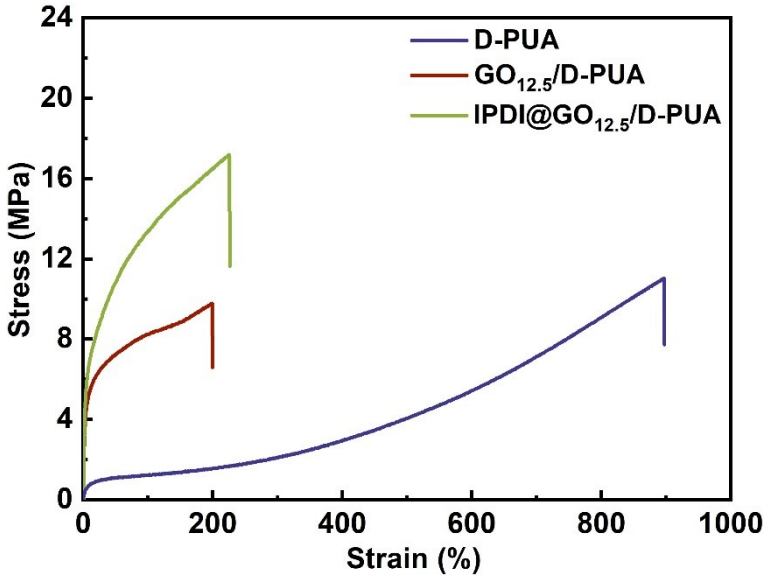

Fig. S12 Stress-strain curves of the D-PUA, $GO_{12.5}$/D-PUA, and IPDI@$GO_{12.5}$/D-PUA.

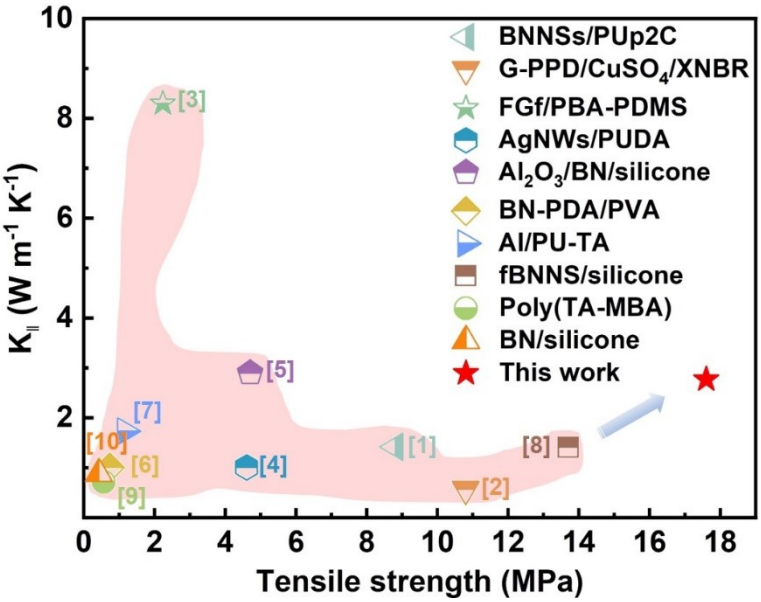

Fig. S13 Comparison of $\kappa_{\parallel}$ and tensile strength for IPDI@$GO_{12.5}$/D-PUA with previously reported composites [1-10].

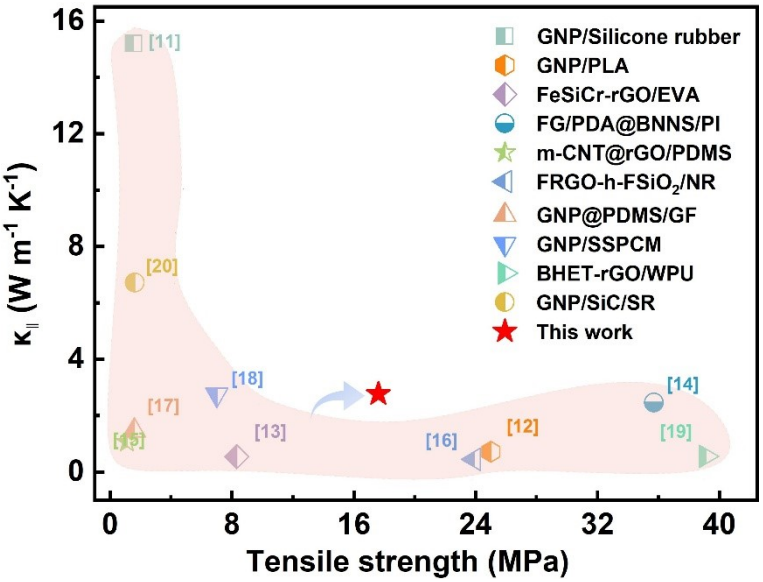

Fig. S14 Comparison of $\kappa_{\parallel}$ and tensile strength for IPDI@$GO_{12.5}$/D-PUA with previously reported graphene-based nanocomposites [11-20].

Fig. S15 Digital image of IPDI@$GO_{12.5}$/D-PUA on petal.

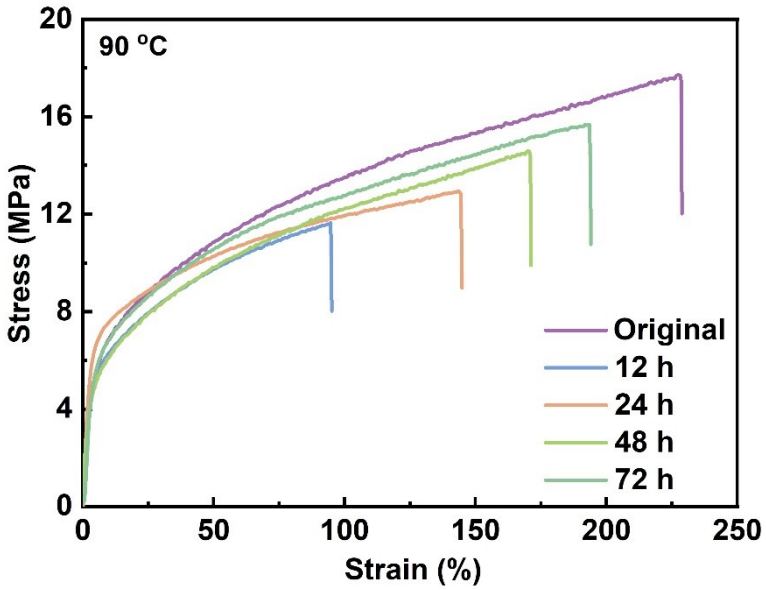

Fig.S16 Stress-strain curves of the IPDI@$GO_{12.5}$/D-PUA at 90 °C for different healing durations (12 h, 24 h, 48 h, and 72 h).

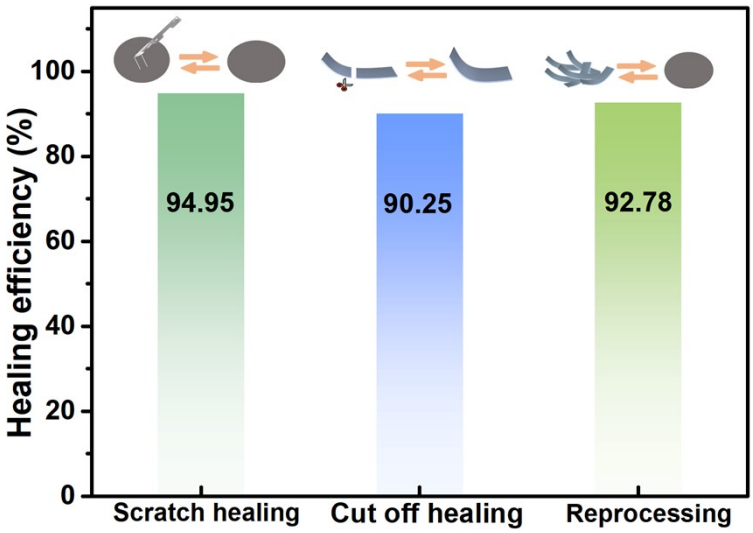

Fig.S17 Healing efficiency of κ_{II} of the IPDI@$GO_{12.5}$/D-PUA after different self-healing processes.

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