

## **Robust Flexible Janus Composites for Absorption- Dominated EMI Shielding**

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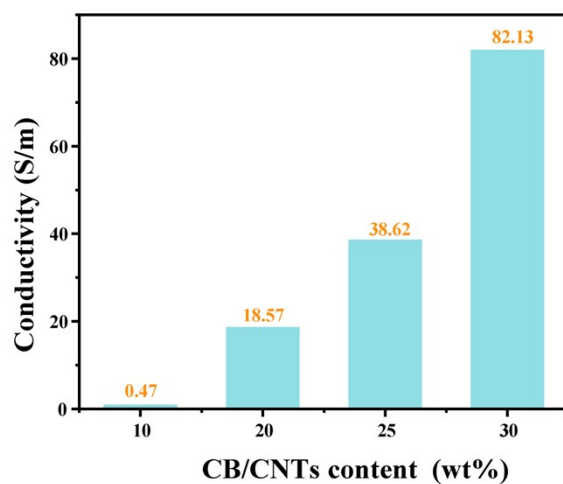
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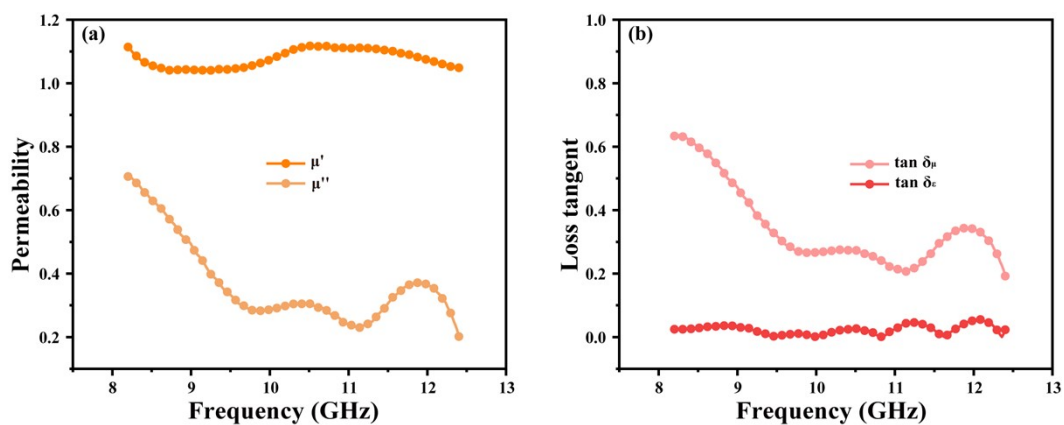
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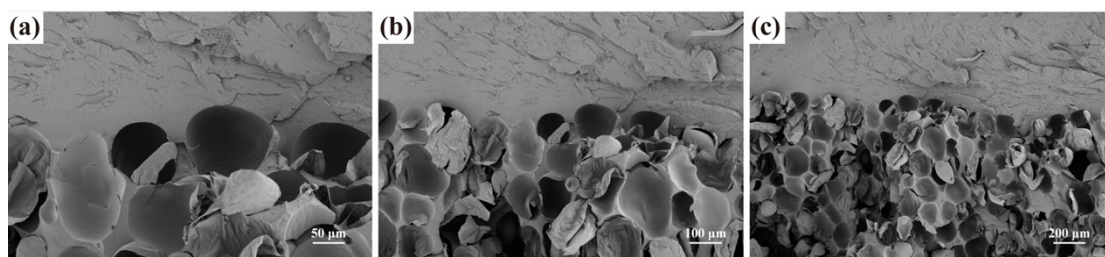
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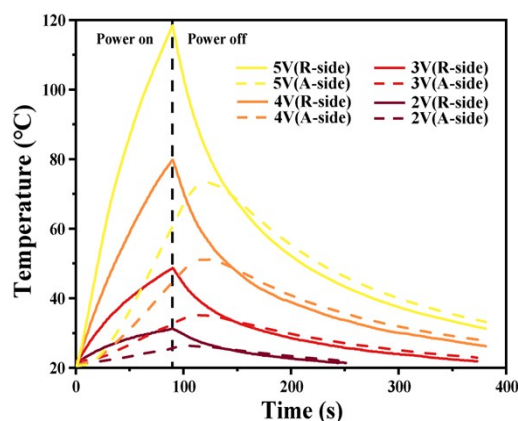
**Fig. S1.** Electrical conductivity of the EPDM/POE-based reflective layers with various CB/CNT loadings.



**Fig. S2** (a) complex permeability ( $\mu'$ ,  $\mu''$ ) and (b) comparison of magnetic loss tangent ( $\tan \delta_\mu$ ) and dielectric loss tangent ( $\tan \delta_\epsilon$ ).



**Fig. S3** Cross-sectional image of the composite after 500 cycles.



**Fig. S4** Real-time Joule heating profiles of the R side (solid lines) and A side (dashed lines) under various DC voltages (2–5 V) at an ambient temperature of 15 °C.



Shielding test.mp4

**Video S1.** Real-time demonstration of the EMI shielding efficiency of the E/P/C30/Fe<sub>3</sub>O<sub>4</sub>@TEMs composite.



Bending and twisting of the composite.mp4

**Video S2.** Real-time demonstration of the flexibility of the E/P/C30/Fe<sub>3</sub>O<sub>4</sub>@TEMs composite.



Joule heating\_5V.mp4

**Video S3.** Joule heating performance of the composite film under an applied voltage of 5 V.

**Table S1.** EMI shielding performance of various shielding materials.

Filler	Filler content	matrix	EMI SE (dB)	Density (g cm <sup>-3</sup> )	SSE (dB cm <sup>3</sup> g <sup>-1</sup> )	ref
Copper	Bulk	/	90.0	9.0	9.0	[1]
Stainless steel	Bulk	/	89.0	8.1	10.98	[1]
Al foil	Bulk	/	66.0	2.7	24.44	[2]
Stainless steel	1.1 vol%	PP	48.0	0.64	75.0	[3]
Ni/PPy	54.39 wt%	PET	77.87	1	77.87	[4]
MXene	90 wt%	SA	57.0	2.3	24.78	[5]
Fe <sub>3</sub> O <sub>4</sub> /MXene	4 wt%/20 mg cm <sup>-2</sup>	Cellulose/PAN	33.0	0.59	55.93	[6]
CB/CNT/Fe <sub>3</sub> O <sub>4</sub>	30 wt% (7:3) /5 wt%	EPDM/POE	40.0	0.52	76.92	<b>This work</b>

## Reference

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