Supporting Information

Stretchable Liquid Metal-based Conductive Textile for Electromagnetic Interference Shielding

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1. The calculation of SE_R, SE_A and EMI SE (SE_{total}) from scattering parameters

Scattering parameters (S_{11} and S_{21}) were recorded to calculate the power coefficients of reflectivity (R), transmissivity (T), and absorptivity (A), and their relationship can be described as:

$$R = |S_{11}|^2 \quad (1)$$

$$T = |S_{21}|^2 \quad (2)$$

$$A = 1 - R - T \quad (3)$$

Then SE_{total}, SE_R, SE_A can be calculated as follows:

$$SE_R = -10\lg(1-R) \quad (4)$$

$$SE_A = -10\lg\left(\frac{T}{1-R}\right) \quad (5)$$

$$SE_{total} = SE_R + SE_A + SE_M \quad (6)$$

where SE_M is the microwave multiple internal reflections, which can be negligible when $SE_{total} \geqslant 10$ dB.

2. The digital photographs for the measurement of EMI SE

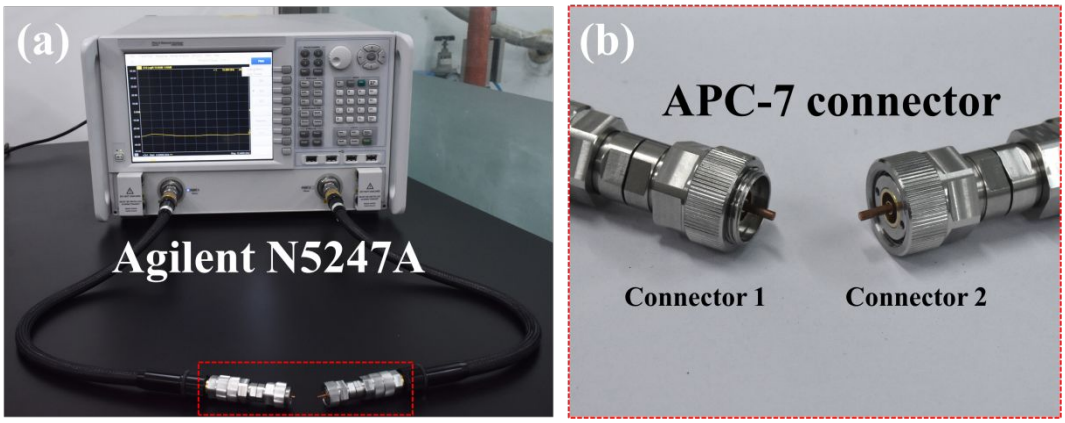


Figure S1. The digital photographs of the (a) Agilent N5247A and (b) APC-7 connector.

3. The digital photographs of pure textile

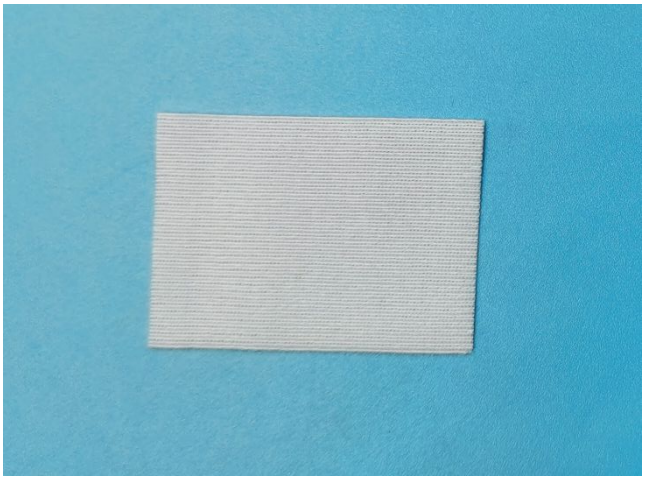


Figure S2. The digital photographs of pure textile.

4. Surface morphology the LM/Textile

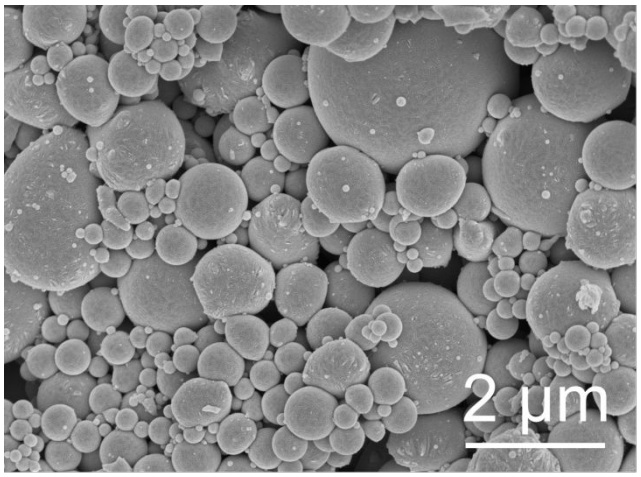


Figure S3. Surface morphology of the LM/Textile with 28.5 mg/cm^2 LM areal density.

5. EDS analysis of the LM/textile and PDMS-LM/Textile

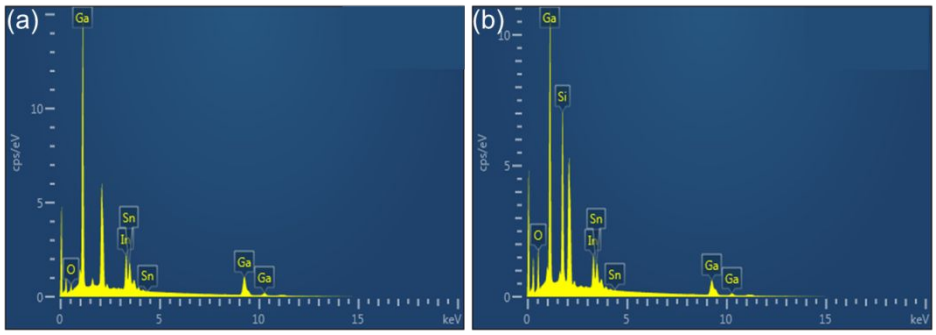


Figure S4. EDS analysis of (a) the LM/textile after mechanical compaction and (b) the PDMS-LM/Textile with a LM areal density 28.5 mg/cm^2.

6. Surface morphology P-LM-I and P-LM-III

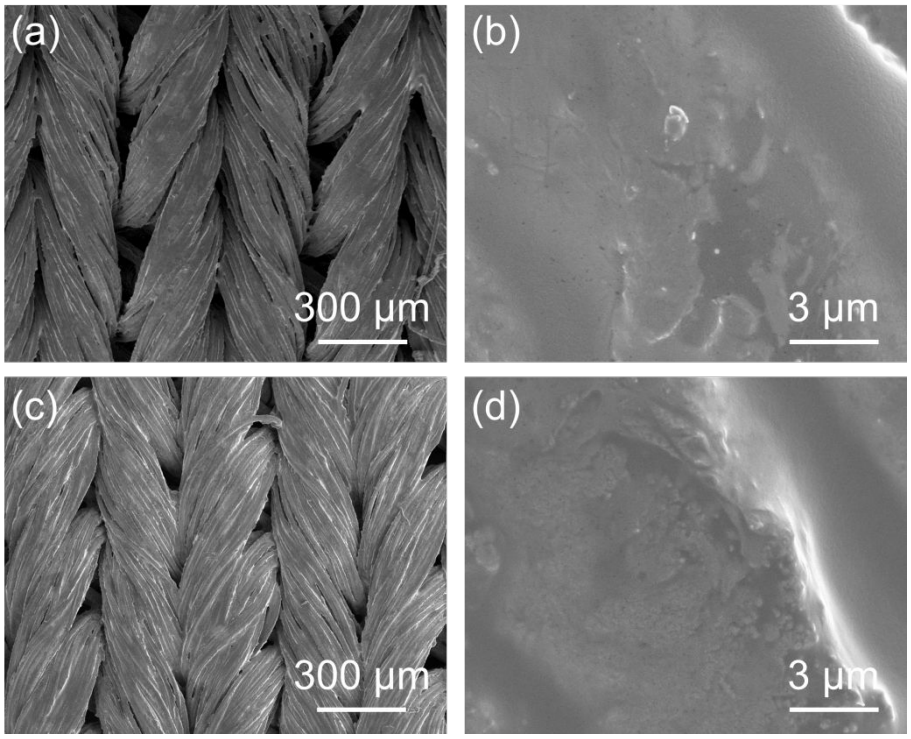


Figure S5. SEM images of (a, b) P-LM-I and (c, d) P-LM-III.

7. The EMI SE of the substrate for the measurement of the stretched EMI shielding performance

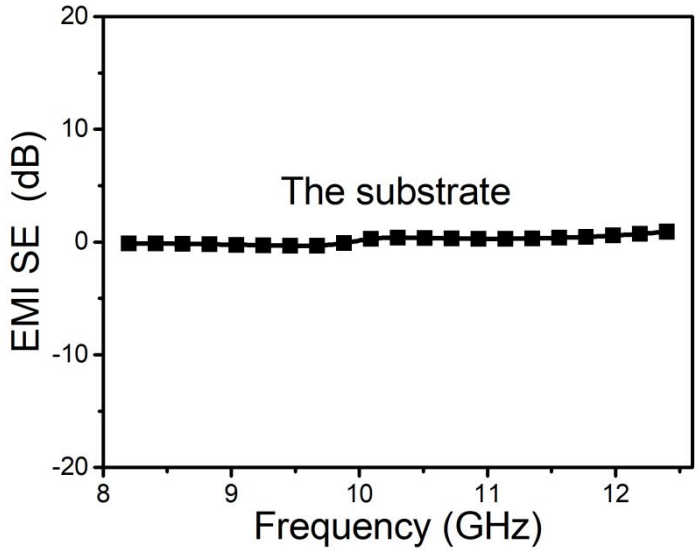


Figure S6. The EMI SE of the substrate for the measurement of the stretched EMI shielding performance of the PDMS-LM/Textile.

8. Comparison of EMI SE for the EMI shielding textiles reported in literature

Table S1. Comparison of EMI SE for P-LM-V with that of the shielding textiles reported in the literature.

Materials	Electrical conductivity (S/m)	Thickness (mm)	EMI SE (dB)	Reference
P-LM-V	**14605.4**	**0.35**	**72.6**	**This work**
CNT/Cotton fabric	36.6	~	21.5 dB	1
CNT-PHEMA/Fabric[a]	~	1.60	18.0	2
CNT/PAM/Fabric[a]	5.3	~	11.9	3
TPU-graphene/Fabric[a]	~264.8	~0.15	20.0	4
WPU-rGO/Cotton fabric	~	1.0	48.1	5
ZnO/rGO/Cotten	15.8	~	54.7	6
PVA-NRL/CB/Cotton[a]	~	0.20	37.7	7
PANI/ASC fabric	9.2	0.78	25.9	8
Cu-coated cotton	~	~	20.9	9
PPy/Cu/CF	~	~	50.4	10
PANI/Co−Ni/lyocell	~	~	34.0-46.2	11
PU-AgNW/Textile	1227	0.6	63.9	12
PDMS-AgNP/PP fabric	8120	0.35	71.2	13
PFDT/AgNP/PP fabric	3390	0.35	48.2	14
CPC-AgNW/Textile	528.3	0.6	51.5	15
MXene/Cotton fabric	~	0.33	36.0	16
PPy-MXene/PET textile	~1000	0.43	42.0	17
PPy-MXene/PET textile	~4000	0.43	66.0	17
MXene-AgNW/Silk fabric	~	0.12	54.0	18

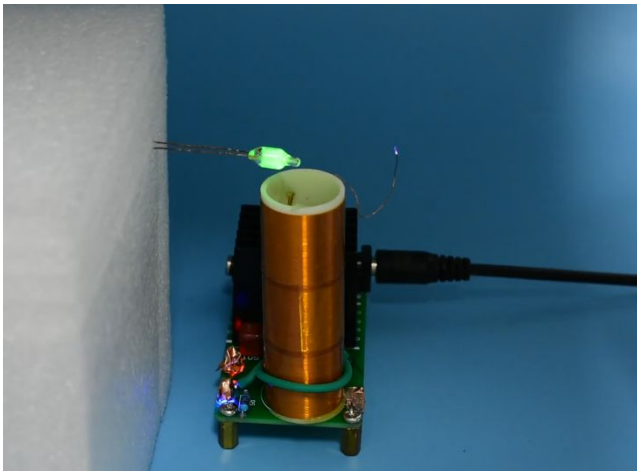
[a]PHEMA, PAM, TPU, WPU, rGO, PVA, NRL, CB, PANI, ASC, PU, AgNW, PDMS, AgNP, PP, PFDT, CPC, PPy are poly (2-hydroxyethyl methacrylate), poly(Allylamine Hydrochloride), thermoplastic polyurethane, waterborne polyurethane, reduced graphene oxide, polyvinyl alcohol, natural rubber latex, carbon black, polyaniline, artificial suede-like cloth, polyurethane, silver nanowire, polydimethylsiloxane, silver nanoparticle, polypropylene, 1H,1H,2H,2H-perfluorodecanethiol, carbon nanotube-polytetrafluoroethylene-fluoroacrylic polymer, and polypyrrole, respectively.

Table S2 Comparison of EMI SE of the stretchable EMI shielding materials

Materials	Stretching strain	EMI SE (dB)		Reference
		0%	at strain	
P-LM-V	**30/50%**	**72.6**	**66.0/52.4**	**This work**
Ni@EGaIn	75%	75	60	19
EGaIn/silicone	50/100/400%	41.5	50/56.5/81.6	20
CNT/TPU	50/100%	34.6	29.8/22.5	21
PEDOT:PSS/PU[a]	15%	~62	~54	22
AgNW/PDMS	30/50%	36	29/25	23
PU-AgNW/Textile	30%	63.9	56.2	12
AgNP/SEBS[a]	50/100%	56	42/28	24
MXene/NR	30%	28.7	25.4	25
MXene/latex	100/200%	30	30/30	26

[a]PEDOT:PSS, SEBS and NR are , poly(3,4-ethylenedioxythiophene):polystyrenesulfonate, styrene ethylene butylene styrene and nature rubber, respectively.

9. The operational reliability of the PDMS-LM/Textile



Video S1. Tesla coil test showing the operational reliability of P-LM-V.

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