Electronic Supplementary Information

Flexibly stretchable acrylic resin elastomer films for efficient electromagnetic shielding and photothermal conversion

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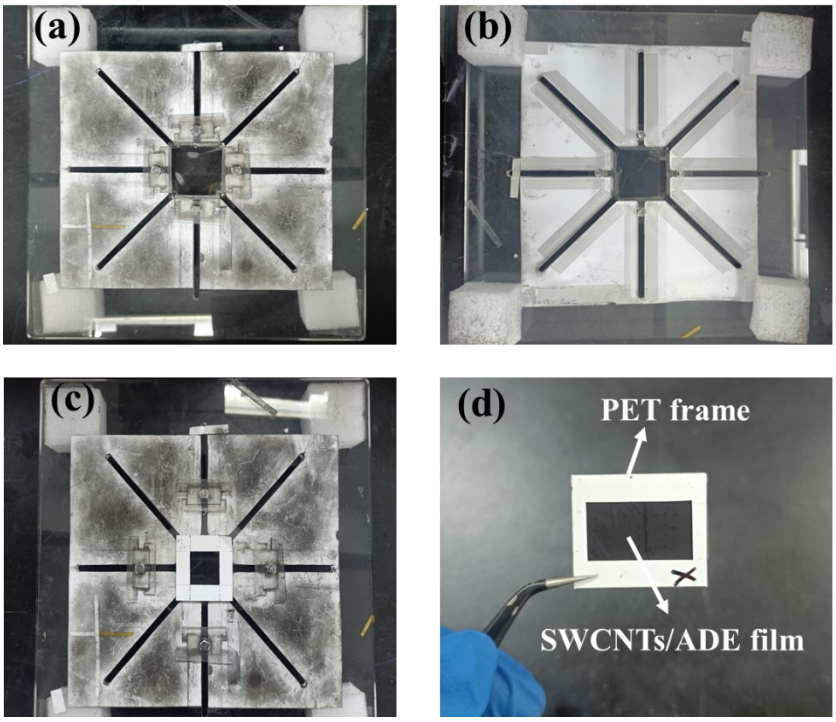
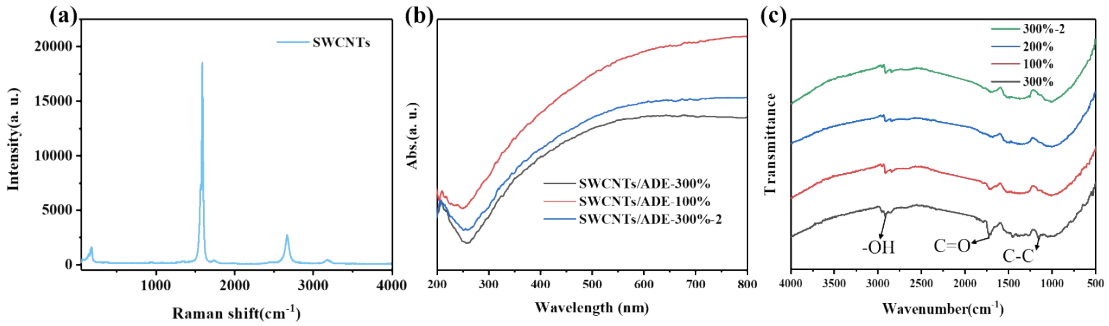


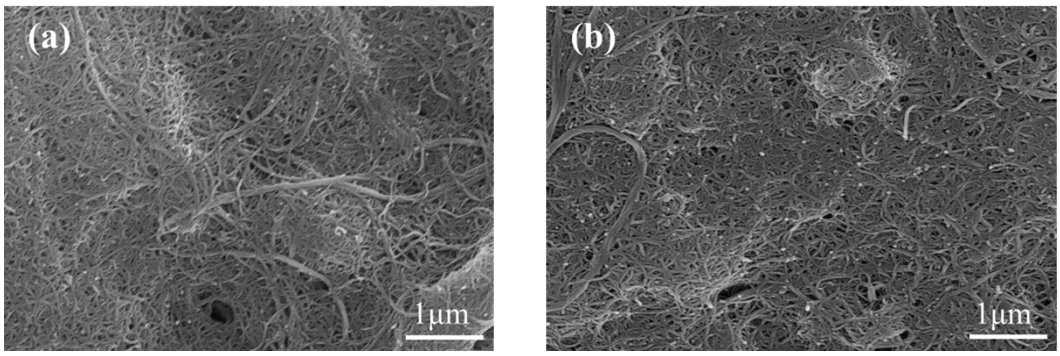
Supplementary Figure 1. Digital images of the top view **(a)** and bottom view **(b)** of the two-axis stretchable device. **(c)** Digital image of a two-axis stretchable device when sprayed with a custom sized mask. **(d)** Digital images of SWCNTs/ADE films fixed with a polyethylene terephthalate (PET) rectangular frame.



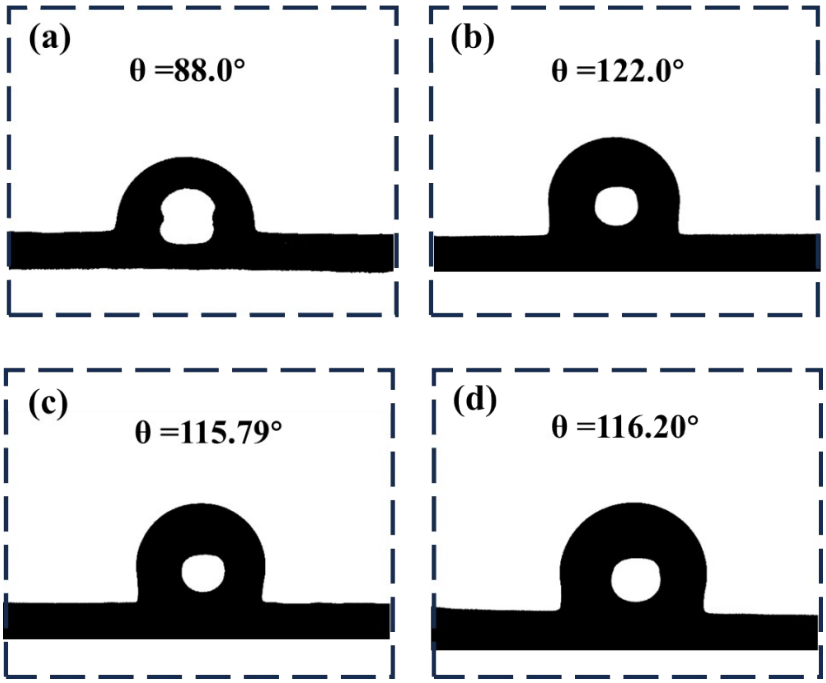
Supplementary Figure 2. (a) Raman spectra of pure single-walled carbon nanotube used in the experiment. **(b)** UV-Vis spectra of the SWCNTs/ADE films. (c) FTIR spectra of the SWCNTs/ADE films.

Due to the high purity of the single-wall carbon nanotube(SWCNTs), the content of amorphous carbon is very small, so the D-peak is not obvious. Because the degree of

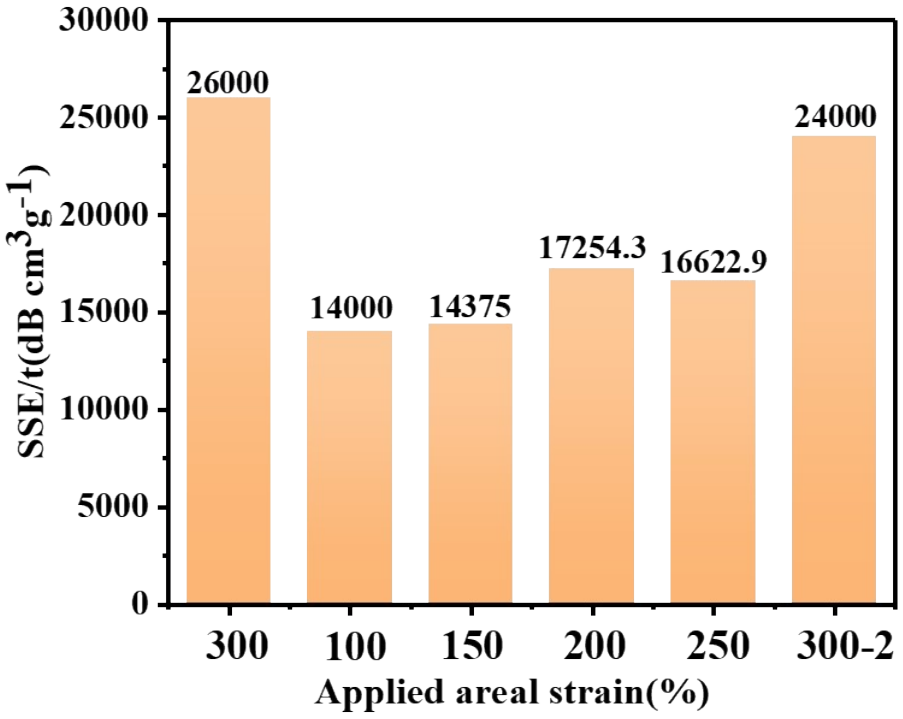
graphitization of SWCNTs is high, so the unsaturated functional groups in the carbon nanotubes are few, thus, the vibration of the -OH peak at 2913 cm^{-1} and the C=O peak at 1726 cm^{-1} is caused by the unsaturated functional groups in the acrylic resin substrate. The highest absorption of SWCNTs/ADE films at 8.6 μm was due to the C-C peak absorption at 1152 cm^{-1}, which resulted in the C-C bond in the conductive layer of SWCNTs.



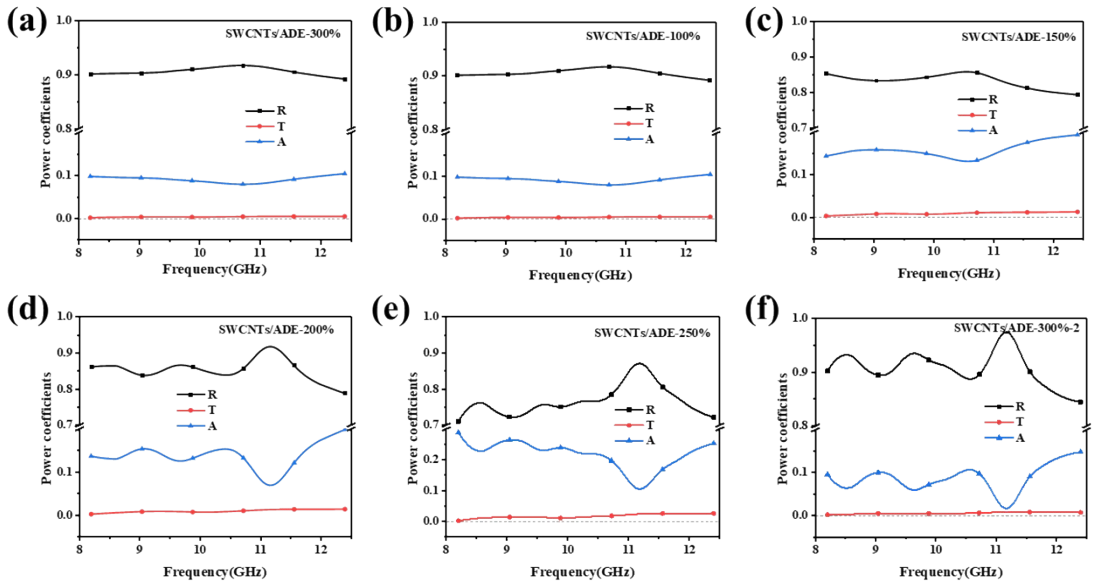
Supplementary Figure 3. SEM images of the SWCNTs distributed randomly and evenly on the ADE substrate of (a) 300% areal strain and (b) 100% areal strain.



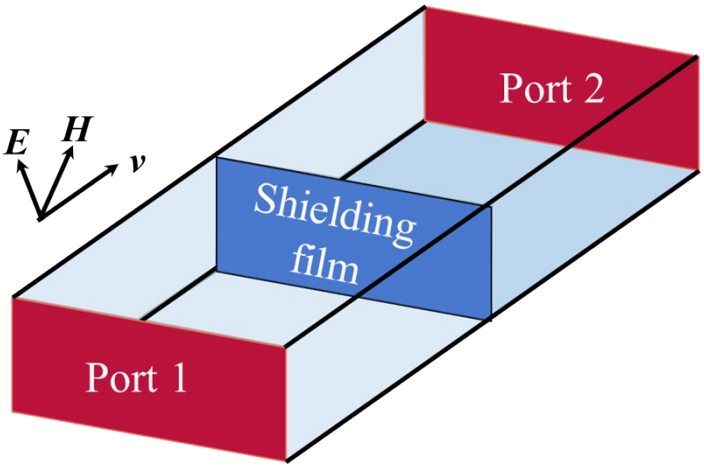
Supplementary Figure 4. (a) Digital image of water contact angle of the blank VHB film. Digital images of water contact angles of SWCNTs/ADE films at different applied areal strains: 150% **(b)**; 250% **(c)**; 300%-2 **(d)**.



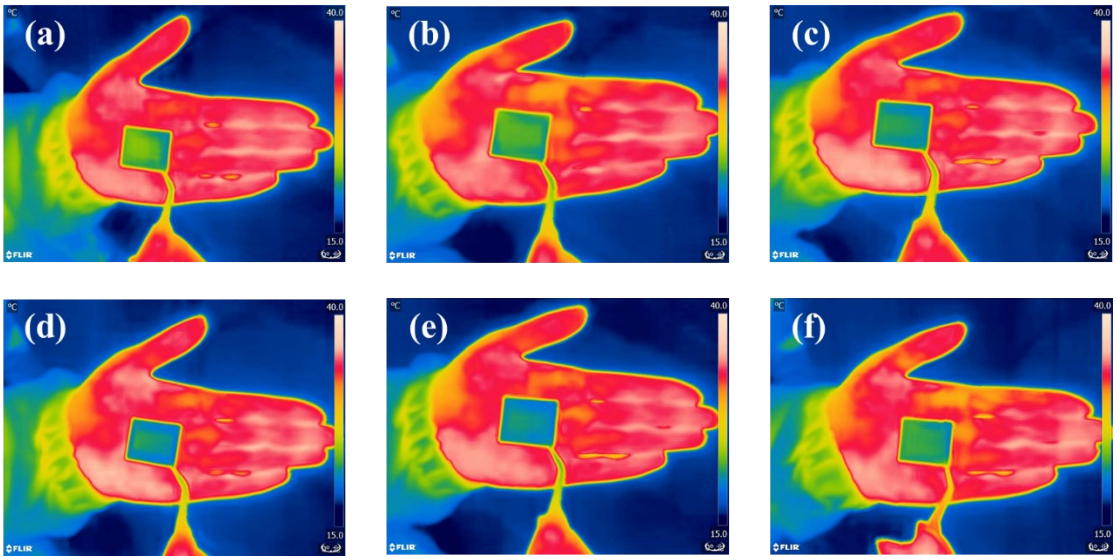
Supplementary Figure 5. SSE/t values of SWCNTs/ADE films under different applied areal strains.



Supplementary Figure 6. Power coefficients of SWCNTs/ADE films at different applied areal strains: 300% **(a)**; 100% **(b)**; 150% **(c)**; 200% **(d)**; 250% **(e)** and 300%-2 **(f)**.



Supplementary Figure 7. The waveguide model for EMI shielding performance simulation.



Supplementary Figure 8. Infrared thermal images of SWCNTs/ADE films under different applied areal strains without heating: 300%(a); 100%(b); 150%(c); 200%(d); 250%(e); 300%-2(f).

Supplementary Table 1. Bending times and electromagnetic interference shielding efficiency.

Bending Cycles	Shielding efficiency (%)
0	99.9%
200	99.85%
400	99.6%
600	98.85%
800	98.03%
1000	96%