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Supplementary Information

Efficient electromagnetic interference shielding of lightweight carbon nanotube/polyethylene composite via compression molding plus salt-leaching

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1. SEM images of the fractured surface of the solid CNT/PE composite

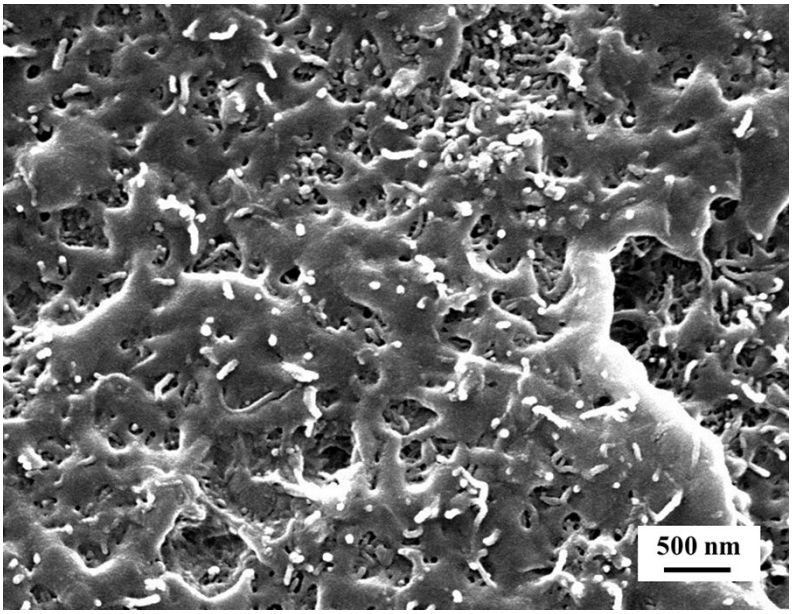

Fig. S1 SEM images of the fractured surface of the solid CNT/PE composite.

2. Table S1 Average EMI SE in X-band frequency range for the CNT/HDPE foam composite and several other reported foam composites in literature.

Polymer matrix	Filler content	Density (g/cm^3)	EMI SE (dB)	Ref.
CNT/HDPE	3.39 vol%	0.26	27.1	Present work
CNT/PS[a)]	7.0 wt%	0.56	20	1
Graphene/PS[a)]	5.6 vol%	0.47	29	2
Graphene/PS[a)]	5.6 vol%	0.27	17	2
Graphene/PEI[a)]	10.0 wt%	0.25	11	3
Graphene/PMMA[a)]	5.0 wt%	0.79	16	4
Graphene/PI[a)]	16.0 wt%	0.28	20	5
CNT/PU[a)]	0.35 wt%	0.71	28	6
CNT/PU[a)]	0.35 wt%	0.58	8	6
CNT/PC[a)]	2.0 wt%	0.56	11	7
CNT/PC[a)]	2.0 wt%	0.44	7	7
CNT/PVDF[a)]	10.0 wt%	0.8	25	8

[a)] PS, PEI, PMMA, PI, and PVDF are polystyrene, polyetherimide, poly (methyl methacrylate), polyimide and polyvinylidene fluoride, respectively.

3. The skin depth of L-CNT/HDPE, M-CNT/HDPE and S-CNT/HDPE

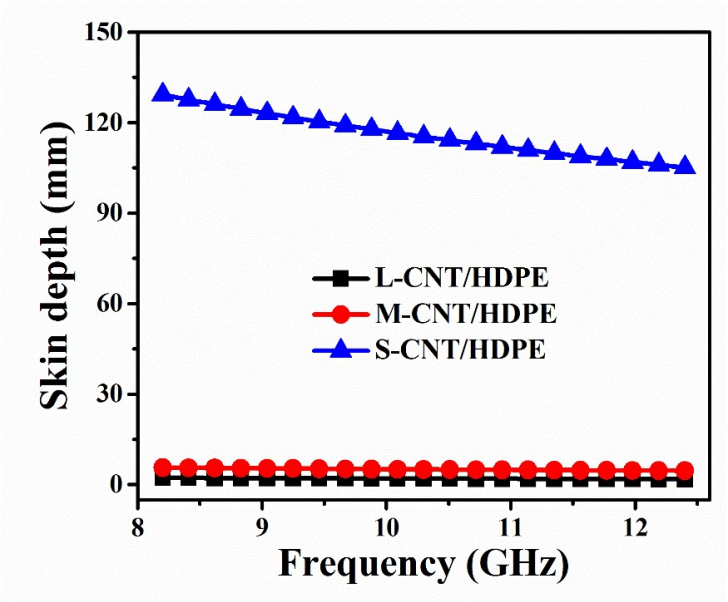

Fig. S2 Variation in skin depth (δ) of L-CNT/HDPE, M-CNT/HDPE and S-CNT/HDPE as a function of frequency.

The skin depth (δ) of a shielding material can be calculated using the formula $\delta = 1/\sqrt{\pi f \sigma \mu}$ (Song W. L., Carbon 2014, 66, 67), where f is the frequency, σ is electrical conductivity, and μ is the magnetic permeability of materials with a relationship of $\mu=\mu_o\mu_\gamma$ ($\mu_o= 4\pi \times 10^{-7}$ H/m, μ_r is material's relative magnetic permeability and is equal to 1 for the nonmagnetic composite). The final calculated results are plotted in Fig. S2. It is observed that δ of S-CNT/HDPE significantly decreases with increased frequency, while δ of L-CNT/HDPE and M-CNT/HDPE is almost independent on frequency. For example, δ of S-CNT/HDPE is 129.2 and 105.1 mm at 8.2 and 12.4 GHz, respectively, meaning that a higher EMI SE can be achieved in S-CNT/HDPE at the high frequency.

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