Supporting Information

Position Selective Dielectric Polarization Enhancement in CNTs Based Heterostructures for High-Efficient Microwave Absorbing

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According to Debye theory, the conduction loss (ε_c") is defined as follows, $\varepsilon_c" = \frac{\sigma}{2\pi f \varepsilon_0}$, where σ, *f*, and ε_0 are the electrical conductivity, the frequency, and the permittivity of vacuum, respectively.

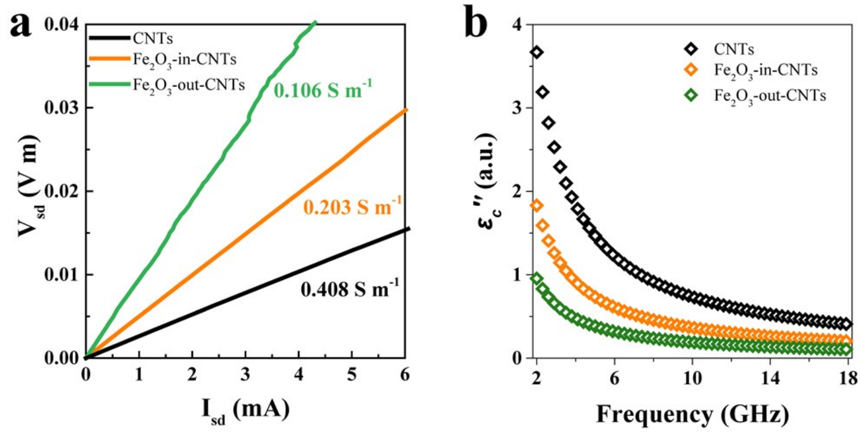

Fig. S1 The electrical conductivity **(a)** and conduction loss **(b)** of Fe_2O_3-in-CNTs, Fe_2O_3-out-CNTs, and CNTs.

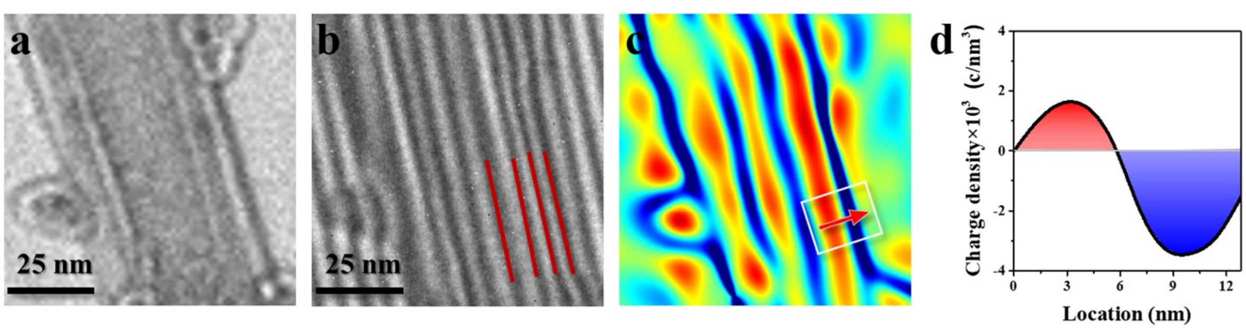

Fig. S2 The TEM image **(a)**, the holograms image **(b)**, the charge density distribution map **(c),** and the charge density plot **(d)** around the interface of CNTs without combining with Fe_2O_3 in the region of the red arrow.

Table S1 The microwave absorption performance of Fe_2O_3-in-CNTs and Fe_2O_3-out-CNTs compared with other reported dielectric/magnetic composites.

Sample	**Thickness (mm)**	**RL_{min} (dB)**	**Effective bandwidth (GHz)**	**Ref.**
Fe/SiC	1.5	-22.0	2.05	1
Al doped SiC	2.4	-25.4	2	2
C@Co/SiC	1.8	-20	5.8	3
Graphene@Fe	2.0	-27	4.25	4
Graphene@Fe_3O_4@SiO_2@NiO	3.0	-27	4.8	5
3D graphene-Fe_3O_4	3.0	-22.5	4.8	6
RGO/$MnFe_2O_4$	3.0	-29	5	7
N-rGA/Ni	2.4	-27	6.7	8
Co@NPC	1.65	-51.2	4.4	9
$CoFe_2O_4$/C/PANI	2.5	-33.6	8.8	10
Fe_3O_4/CF	2.5	-27	5.2	11
Nickel/Porous Carbon	1.8	-28.4	4.5	12
hierarchically tubular C/Co	2	-52.3	5	13
ZFC-700	1.5	-30.4	4.96	14
Fe_3O_4/CNT	2	-26.5	6.8	15
Fe_2O_3/CNT	1.5	-22	4.8	16
Fe_3C/HCNTs	4	-21.5	5.7	17
$Li_{0.3}Zn_{0.3}Co_{0.1}Fe_{2.3}O_4$/CNT	1	-21	7	18
FeSiAl/CNT	2	-22	4.2	19
PANI/Fe_3O_4/CNT	4	-17	7.2	20
Fe_2O_3-in-CNTs	**2.6**	**-27.4**	**5.1**	**This work**

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