Supporting Information for

Multicomponent Nanoparticles Synergistic One-Dimensional Nanofibers as Heterostructure Absorbers for Tunable and Efficient Microwave Absorption

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Supplementary Figures and Table

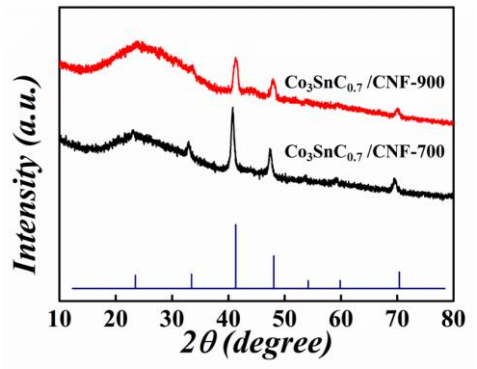

Fig. S1 XRD patterns of samples $Co_3SnC_{0.7}$/CNF-700 and $Co_3SnC_{0.7}$/CNF-900

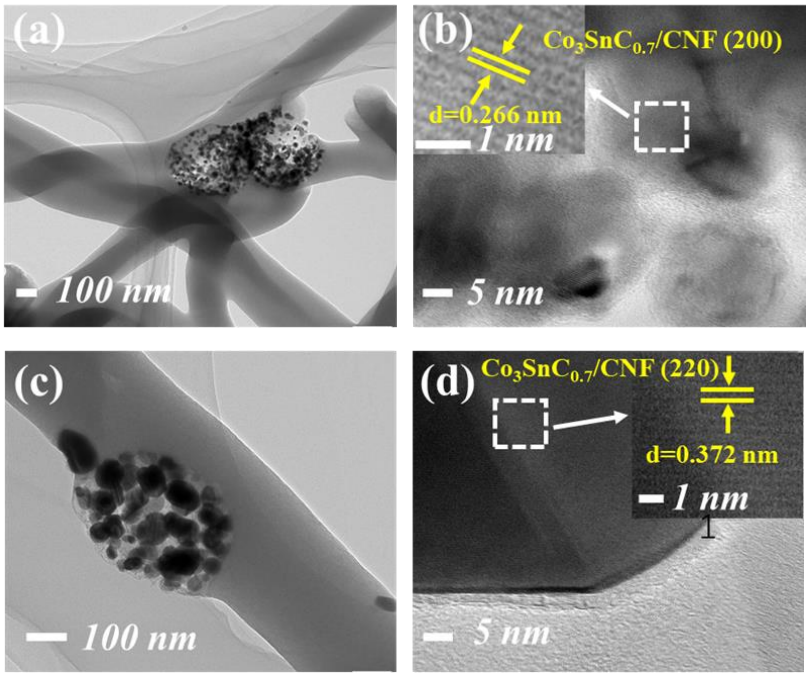

Fig. S2 The TEM images of $Co_3SnC_{0.7}$/CNF-700 (**a, b**) and $Co_3SnC_{0.7}$/CNF-900 (**c, d**)

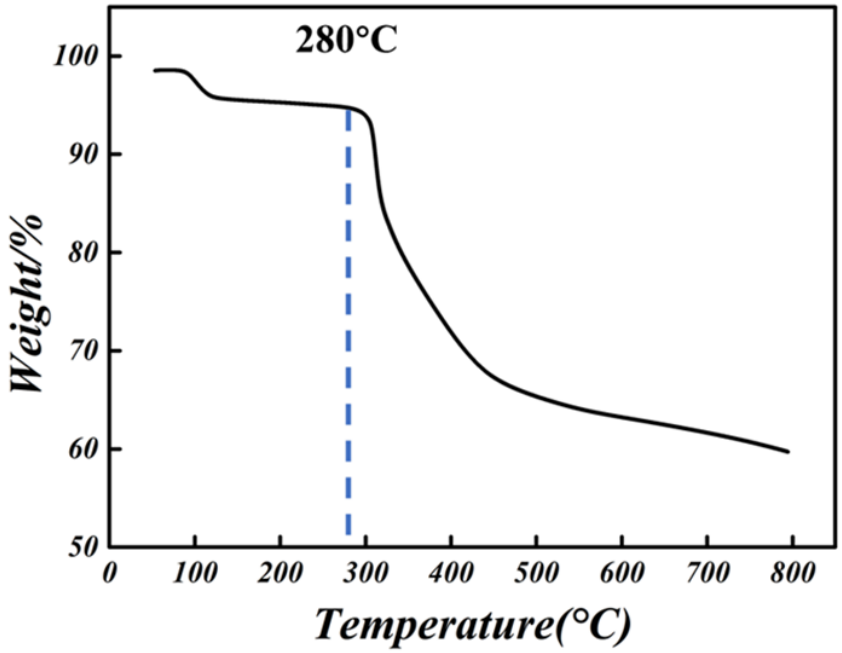

Fig. S3 Thermogravimetric curve of samples $CoSnO_3$/PANF

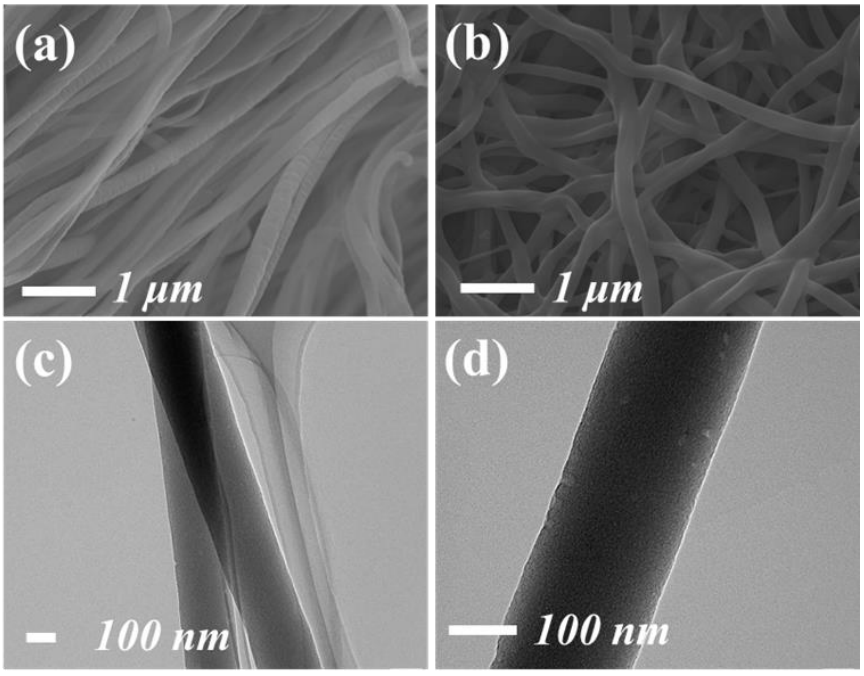

Fig. S4 SEM images of PANF (**a**), CNF (**b**); The TEM images of CNF (**c, d**)

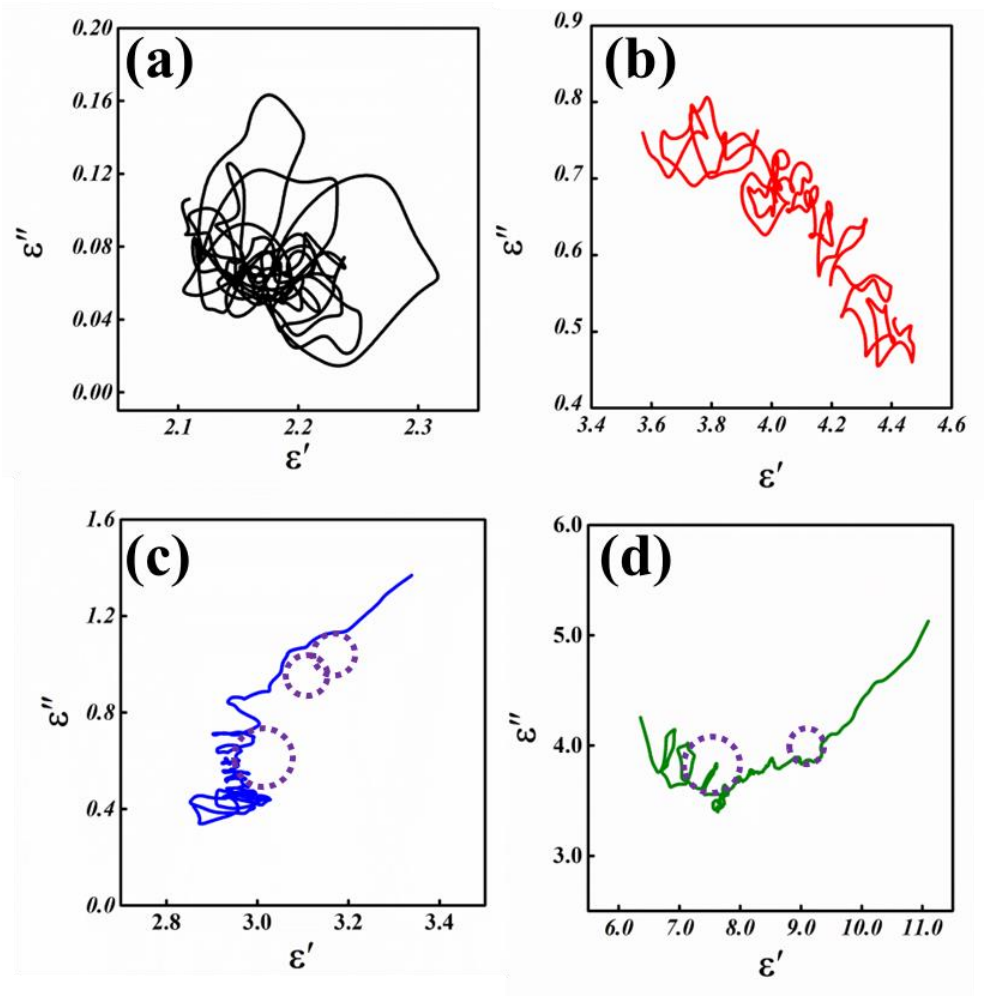

Fig. S5 The Cole-Cole curves of $CoSnO_3$/PANF (**a**), CNF (**b**), $Co_3SnC_{0.7}$/CNF-700 (**c**) and $Co_3SnC_{0.7}$/CNF-900 (**d**)

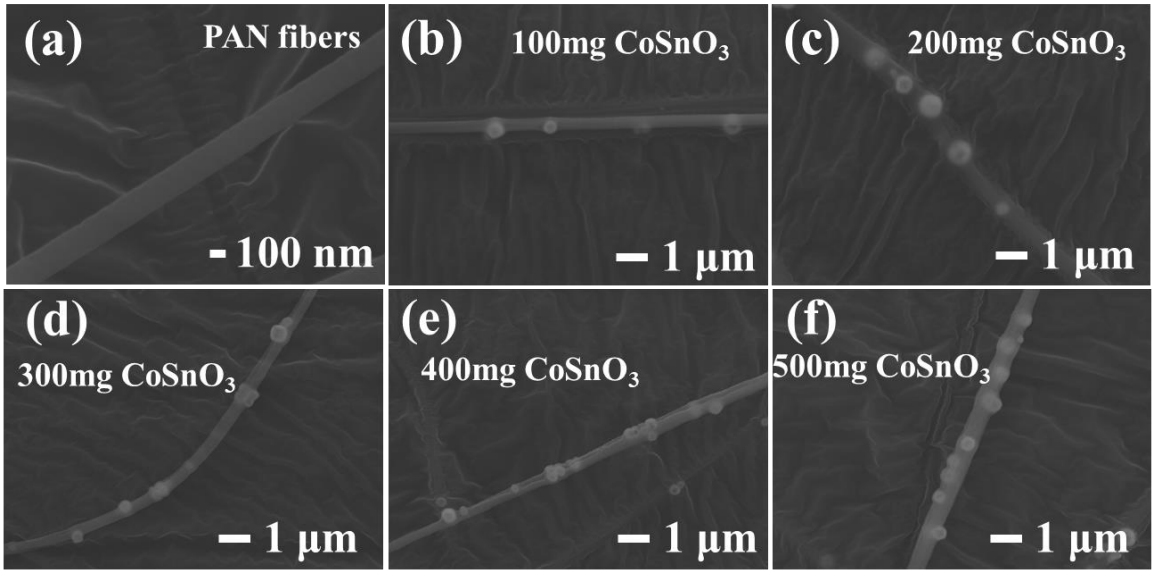

Fig. S6 The SEM images of $CoSnO_3$/PANF with 0 mg (**a**), 100 mg (**b**), 200 mg (**c**), 300 mg (**d**), 400 mg (**e**) and 500 mg (**f**) $CoSnO_3$ content

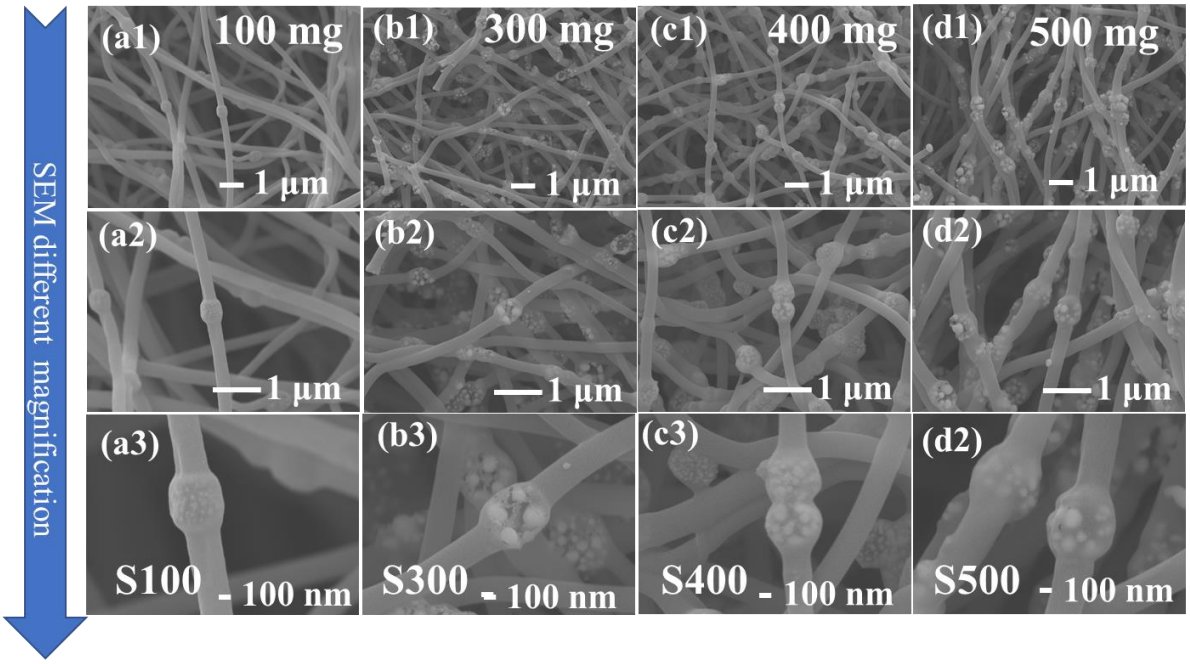

Fig. S7 The different magnifications SEM images of S100 (**a1-3**), S300 (**b1-3**), S400 mg (**c1-3**) and S500 (**d1-3**)

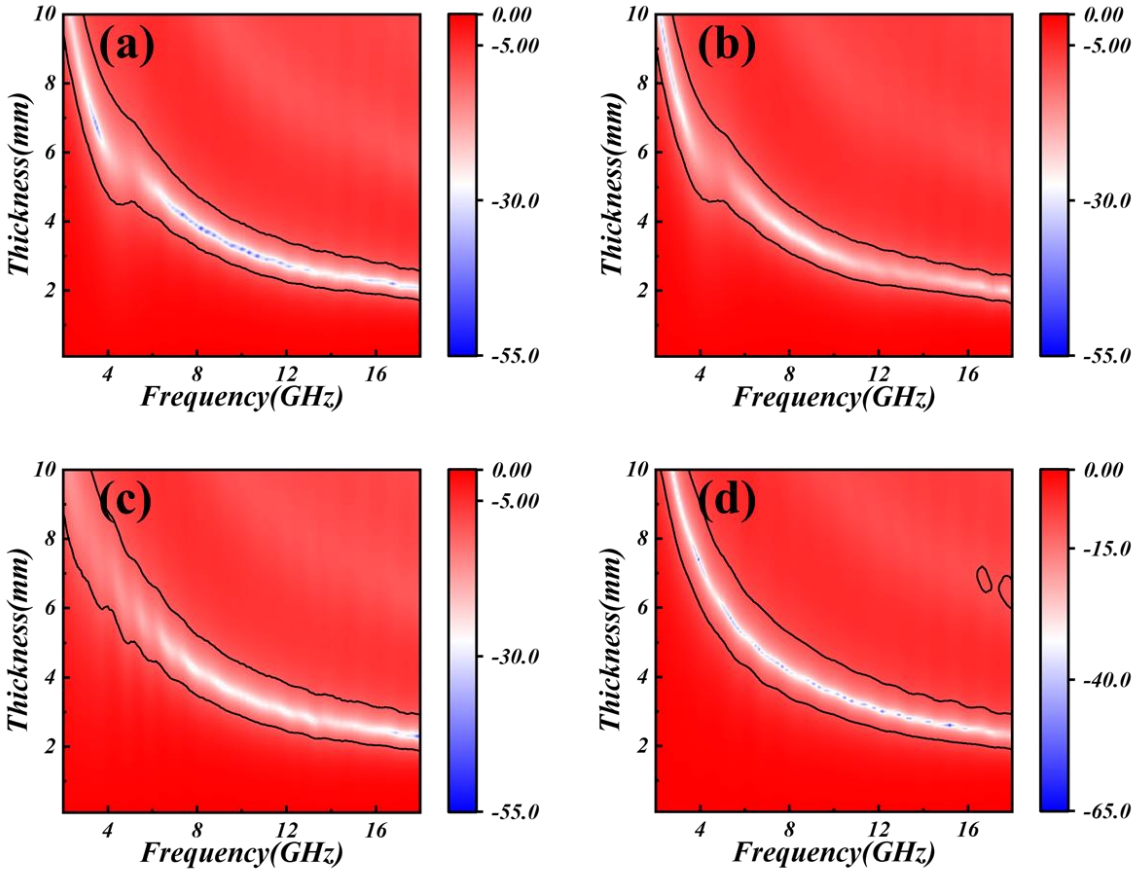

Fig. S8 2D effective bandwidth of S100 (**a**), S100 (**b**), S100 (**c**), S100 (**d**)

Table S1 Electromagnetic wave absorption performance of one-dimensional carbon matrix composites absorbers reported in previous studies and this work

EMW absorbers	**RL/dB**	**t_m(mm)**	**f_E/GHz**	**Refs.**
CF@1T/2H -MoS_2	-43	2.7	8.75 (3.5 mm)	[6]
CF@MXene@MoS_2	-61.51	3.5	7.6 (2.1 mm)	[16]
MMC	-51.6	1.6	4.6	[17]
CNT/SiC_f	-62.5	4	8.8 GHz	[23]
HCF@CZ-CNTs	-53.5	2.9	8.02 (2 mm)	[26]
Co-LDHs/SCFs	-40.4	2.0	6.5 (2.1 mm)	[27]
CN-ABF	-75.19	2.66	4.56 (2.66 mm)	[29]
Co@NCNTs/CF	-57.8	2	4.5 (2 mm)	[30]
SiC@C@PPy	-59.32	3.01	8.4 (2.78 mm)	[45]
ZrO_2-SiC/SiO_2	-18.1	10	5.52	[48]
CNTs/CF	-44.46	3	14.24 (0.5-6.0 mm)	[56]
$Co_3SnC_{0.7}$/CNF-700	-21.6	7.2	6.56 (8.0 mm)	This work
$Co_3SnC_{0.7}$/CNF-800	-51.7	2.3	7.44 (2.5 mm)	This work
$Co_3SnC_{0.7}$/CNF-900	-21.7	2.0	5.92 (2.2 mm)	This work
S400	-47.3	2.3	8.08 (2.6 mm)	This work
S500	-62.0	2.6	8.0 (2.9 mm)	This work