Supplementary Information

Multifunctional core-shell $CaSnO_3$@N-doped carbon coaxial nanocables with excellent lithium storage performance and efficient microwave absorption

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The model construction and excitation configuration of RSC simulation.

The size dimensions of the perfect electrical conductor (PEC) plate are 180.0 mm × 180.0 mm with a thickness of 0.035 mm. The absorber has the same size dimensions of 180.0 mm × 180.0 mm with PEC plate but a different thickness of 2.5 mm. The far-field position is set to "calculate the field in the direction of the incident plane wave". The polarization mode employed is linear. The following formula is used to perform the RCS calculation [1, 2]:

$$\sigma\ (\mathrm{dB\ m^2}) = 10\log\left[\frac{4\pi S}{\lambda^2}\left|\frac{E_s}{E_i}\right|^2\right]$$

where S, λ, E_s and E_i are the area of simulation model, the wavelength of EM wave, the scattered electric field intensity and the incident electric field intensity, respectively.

Figures:

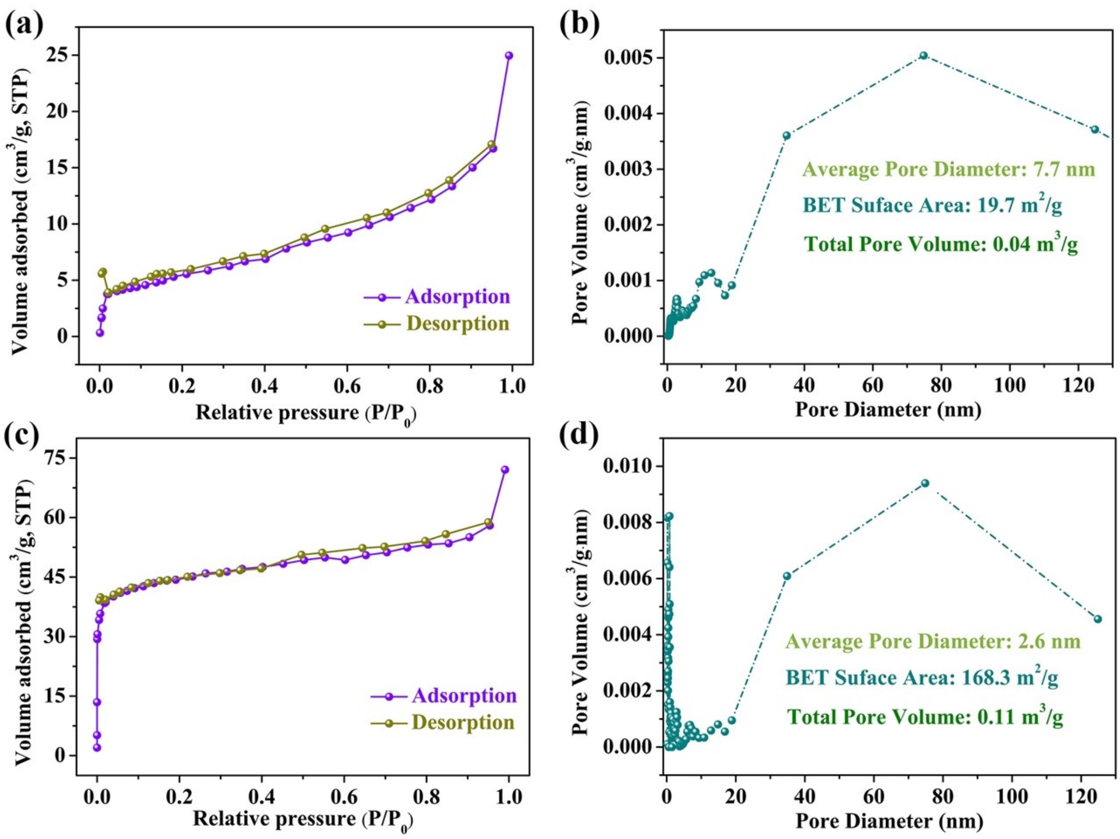

Fig. S1. N_2 adsorption-desorption isotherms and relevant pore size distributions of (a,b) CSONFs and (c,d) CSO@NCNFs-2.

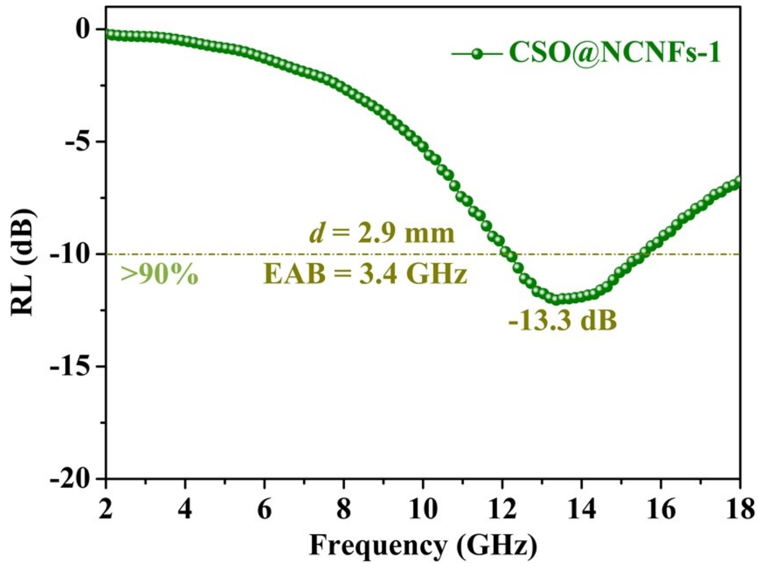

Fig. S2. RL curve and EAB of CSO@NCNFs-1 with an absorber thickness of 2.9 mm.

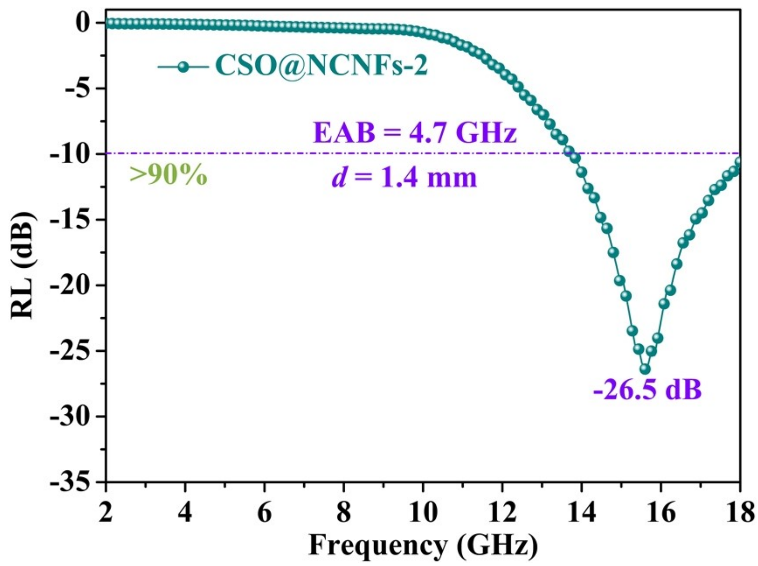

Fig. S3. RL curve and EAB of CSO@NCNFs-2 at an absorber thickness of 1.4 mm.

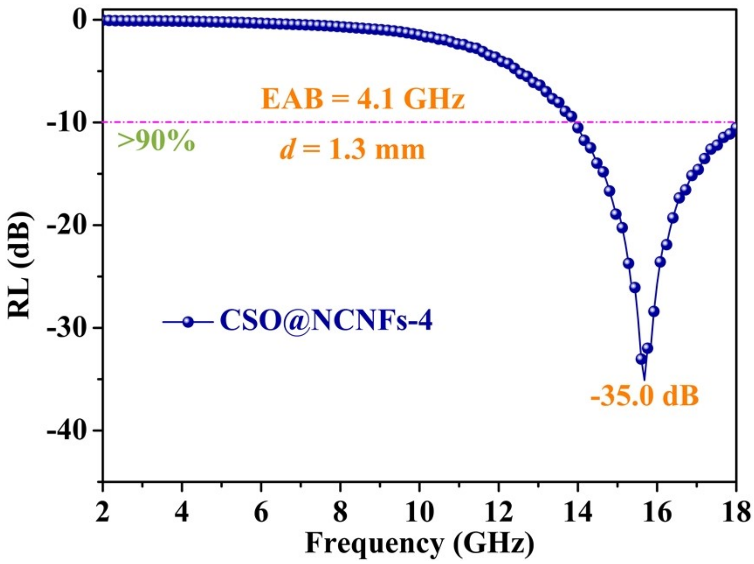

Fig. S4. RL curve and EAB of CSO@NCNFs-4 for an absorber thickness of 1.3 mm.

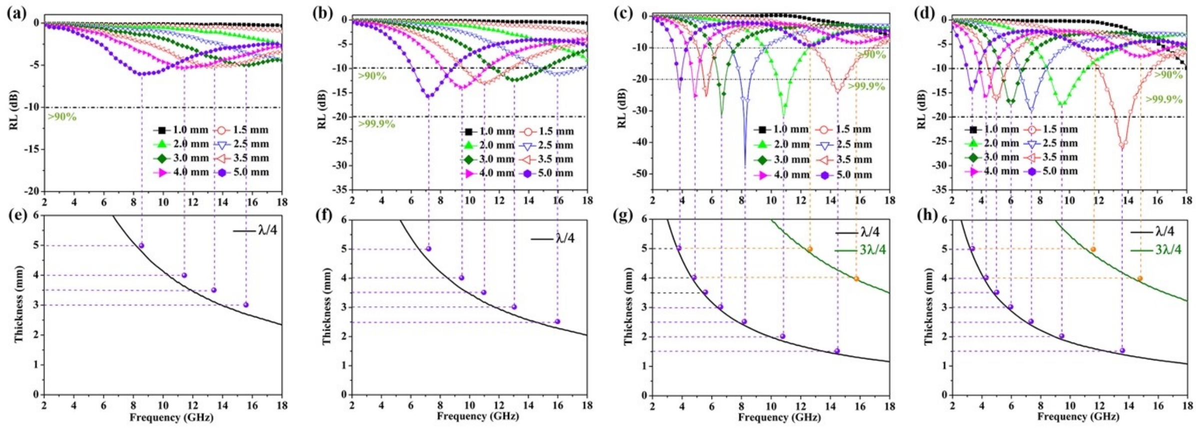

Fig. S5. Frequency dependence of RL values for (a) CSONFs, (b) CSO@NCNFs-1, (c) CSO@NCNFs-2 and (d) CSO@NCNFs-4 samples at different thicknesses. Simulations of matching thickness and peak frequency for (e) CSONFs, (f) CSO@NCNFs-1, (g) CSO@NCNFs-2 and (h) CSO@NCNFs-4 samples under λ/4 and 3λ/4 models.

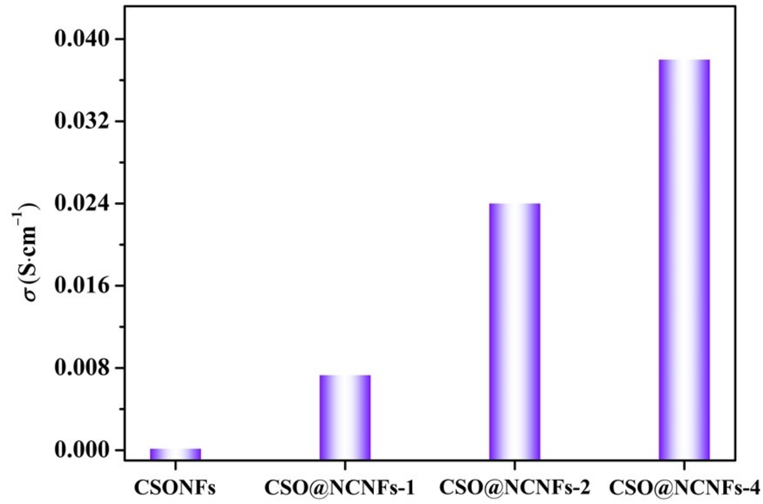

Fig. S6. Electrical conductivity (σ) of CSONFs, CSO@NCNFs-1, CSO@NCNFs-2 and CSO@NCNFs-4.

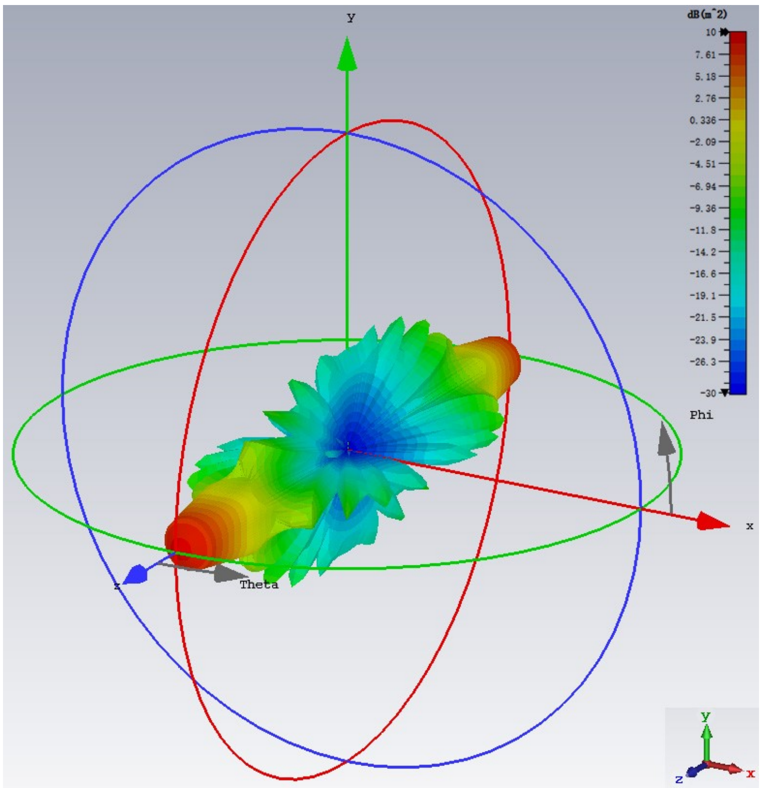

Fig. S7. CST simulation result of PEC.

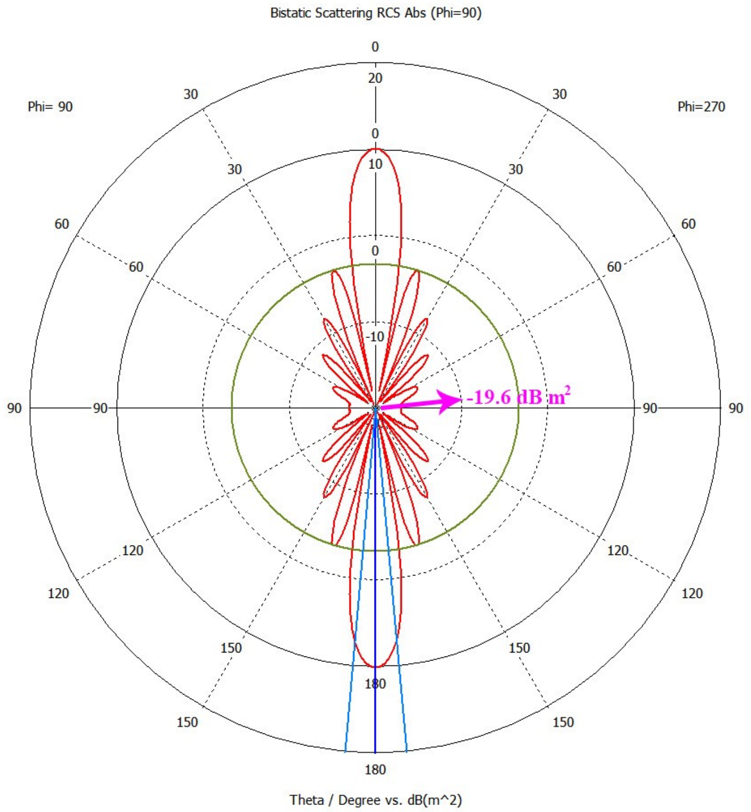

Fig. S8. Polar curve of RCS value for PEC.

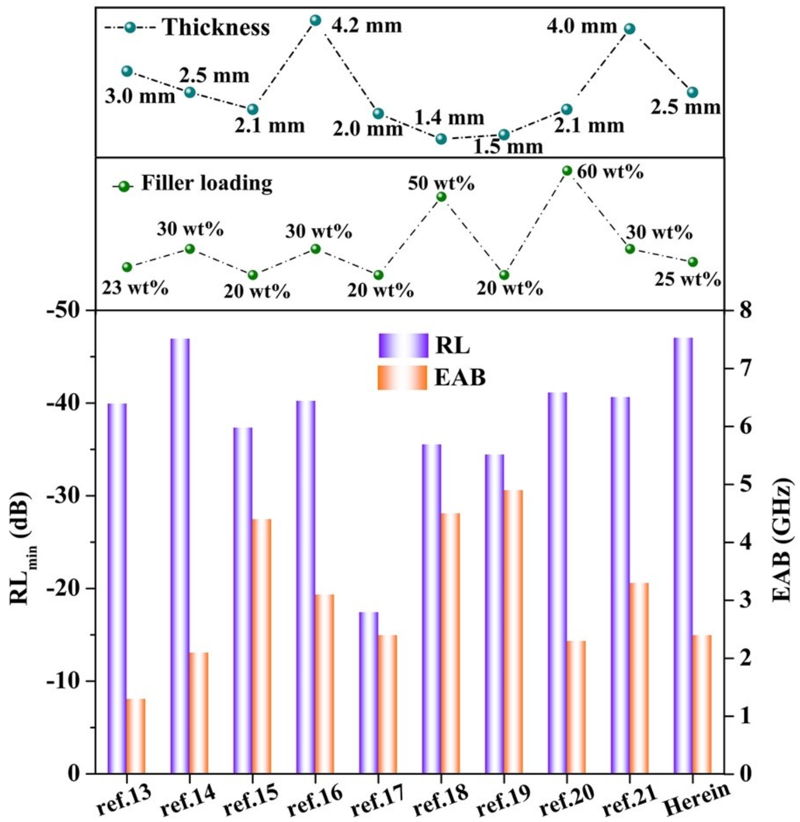

Fig. S9. Comparison of RL_{min}, EAB and filling ratio of some recently reported microwave absorbers.

Tables:

Table S1 Comparison of lithium storage performances of CSO@NCNFs-2 and other $CaSnO_3$-based and carbon-based electrode materials.

electrode	Current rate	Capacity (mA h g^{-1})	Capacity retention	CE	Cycles	Ref.
CSO-nanotubes	60 mA g^{-1}	648	~56.3%	98.1%	50	[3]
Porous flowerlike CSO	60 mA g^{-1}	547	~31.3%	99%	50	[4]
C-CTO NTs	60 mA g^{-1}	~170	~13.1%	/	30	[5]
Nano-CSO	60 mA g^{-1}	~450	~38.8%	~98%	30	[6]
CSO-NTs-700	60 mA g^{-1}	565	~48.4%	97.5%	50	[7]
N-doping carbon fiber	1C	~200	~39.2%	/	150	[8]
WO_3-26.36%/carbon	100 mA g^{-1}	540	~36.5%	~99%	150	[9]
CNS-3	100 mA g^{-1}	~468	~47.8%	~99%	200	[10]
O-MCN-150	100 mA g^{-1}	197.7	63.2%	63%	100	[11]
$Ca_2Fe_2O_5$ nanofibers-800	50 mA g^{-1}	530	~50.1%	~98%	100	[12]
CSO@NCNFs-2	100 mA g^{-1}	645.2	53.7%	99%	100	herein

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