

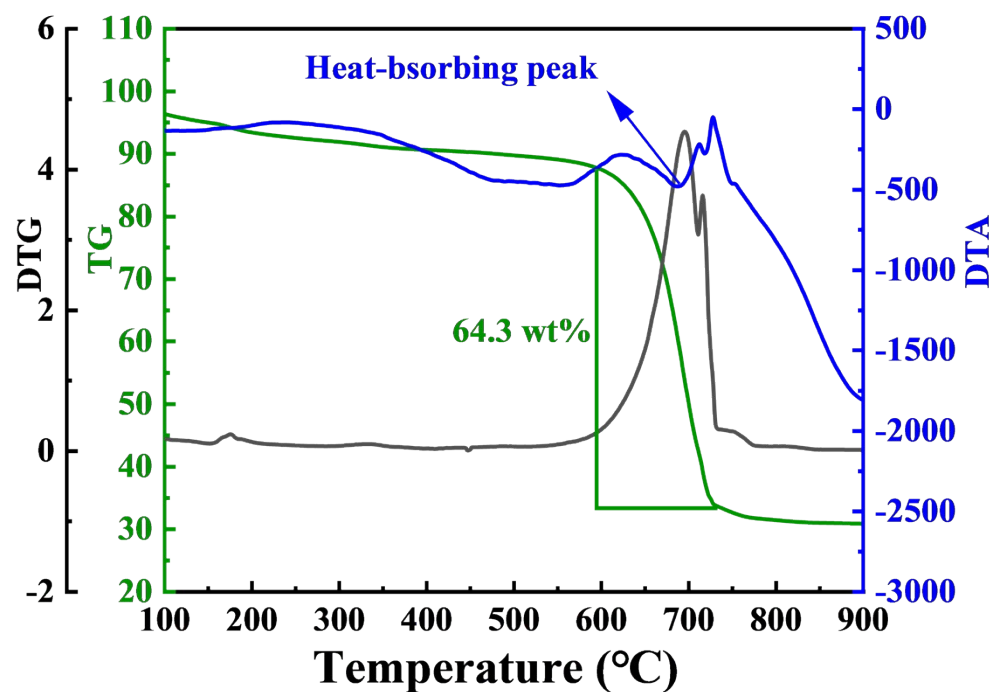
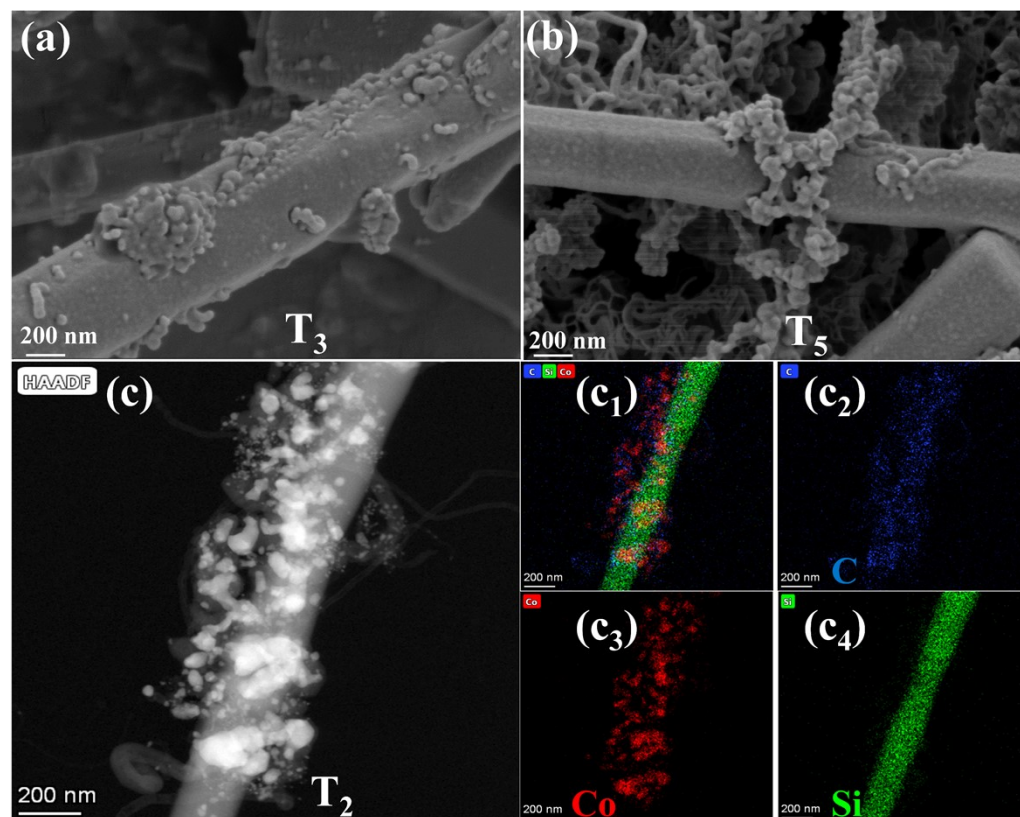


Fig. S1 shows the differential thermal profile of Co/CNT@SiC material.



Figs. S2 (a) and (b) shows SEM images of samples T₃ and T₅, (c) ~ (c₄) show HAADF-STEM maps of sample T₂.

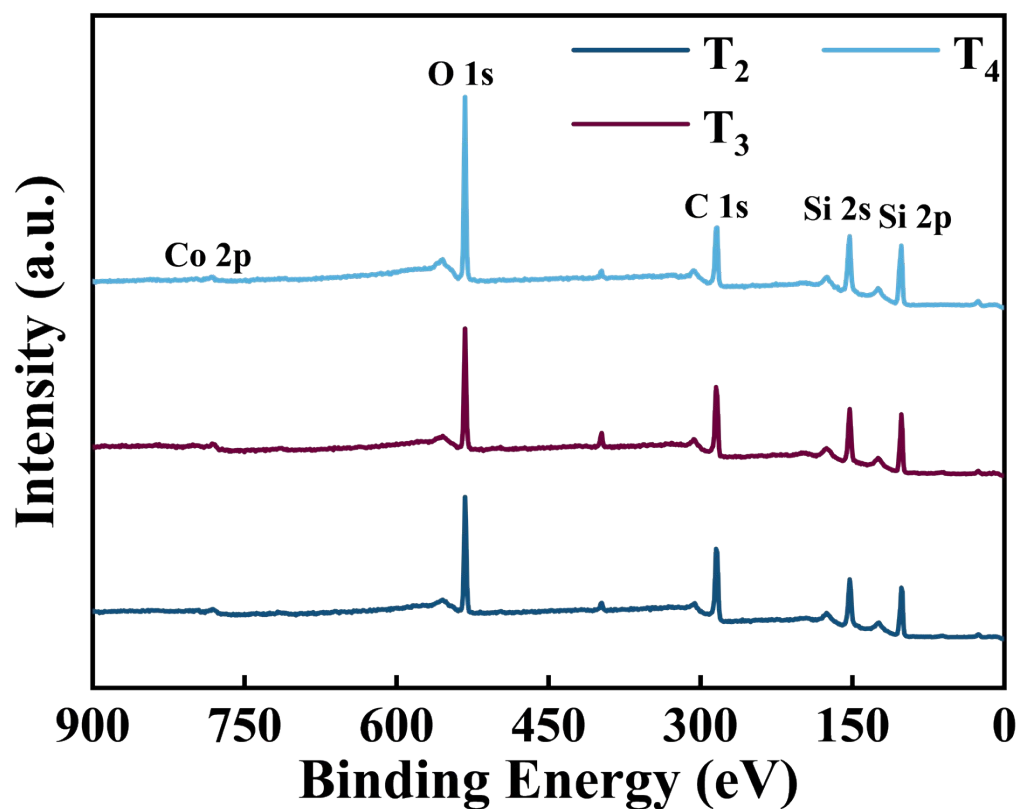
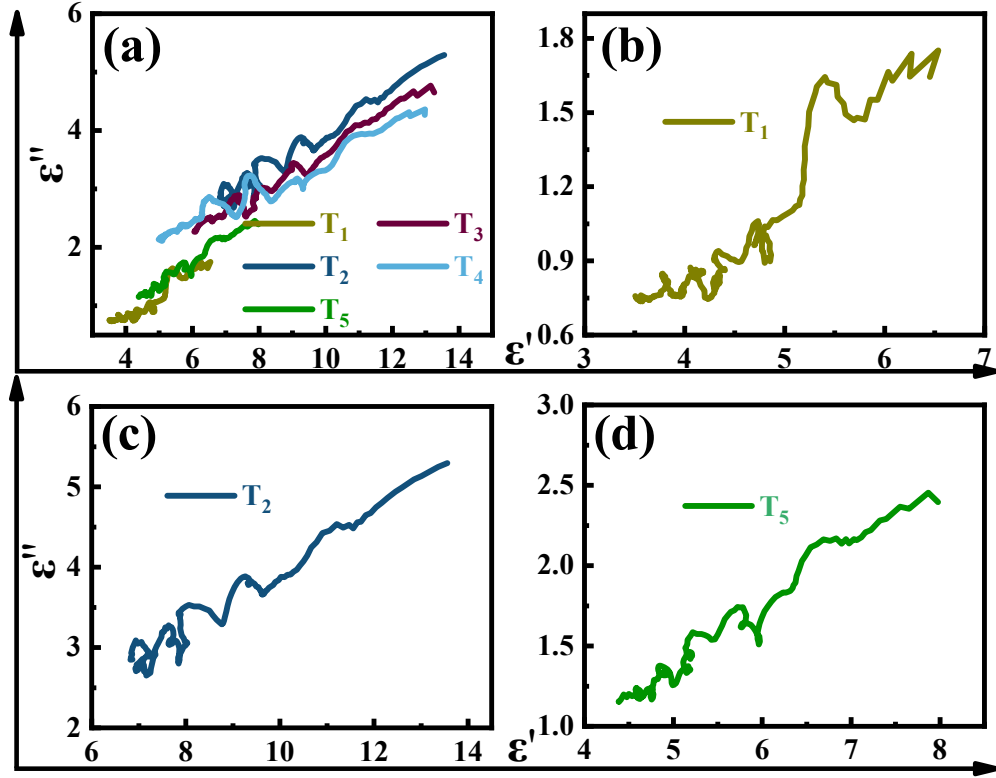


Fig. S3 shows the full XPS spectra of samples T₂, T₃ and T₄.

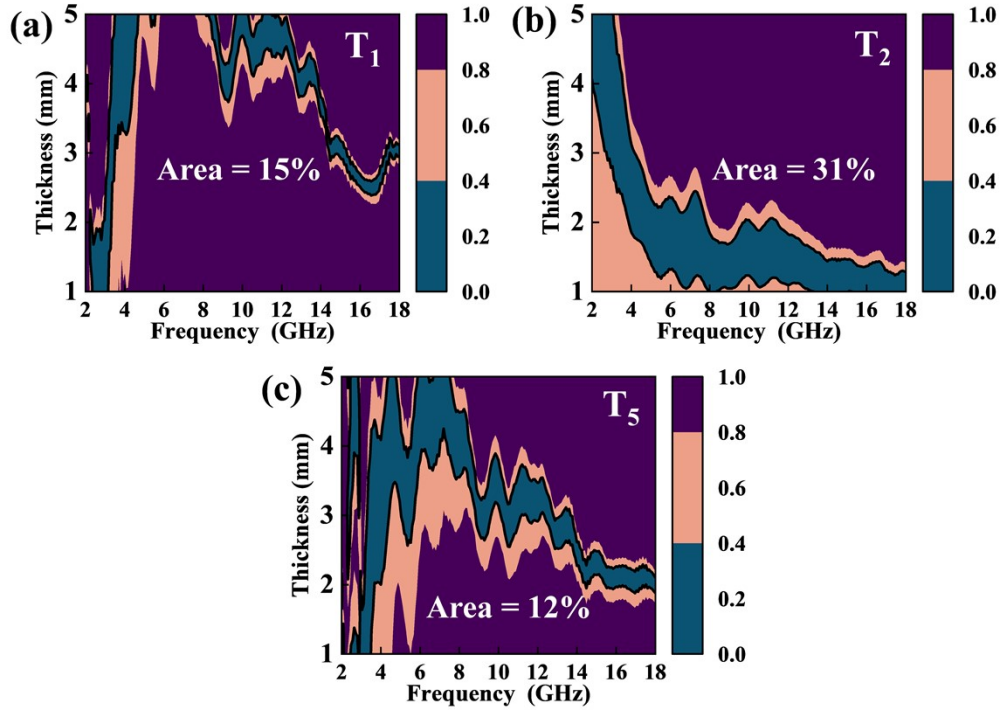
Table S1

Determination of mass ratios of elements in the samples according to the deviation of XPS from stoichiometric ratios

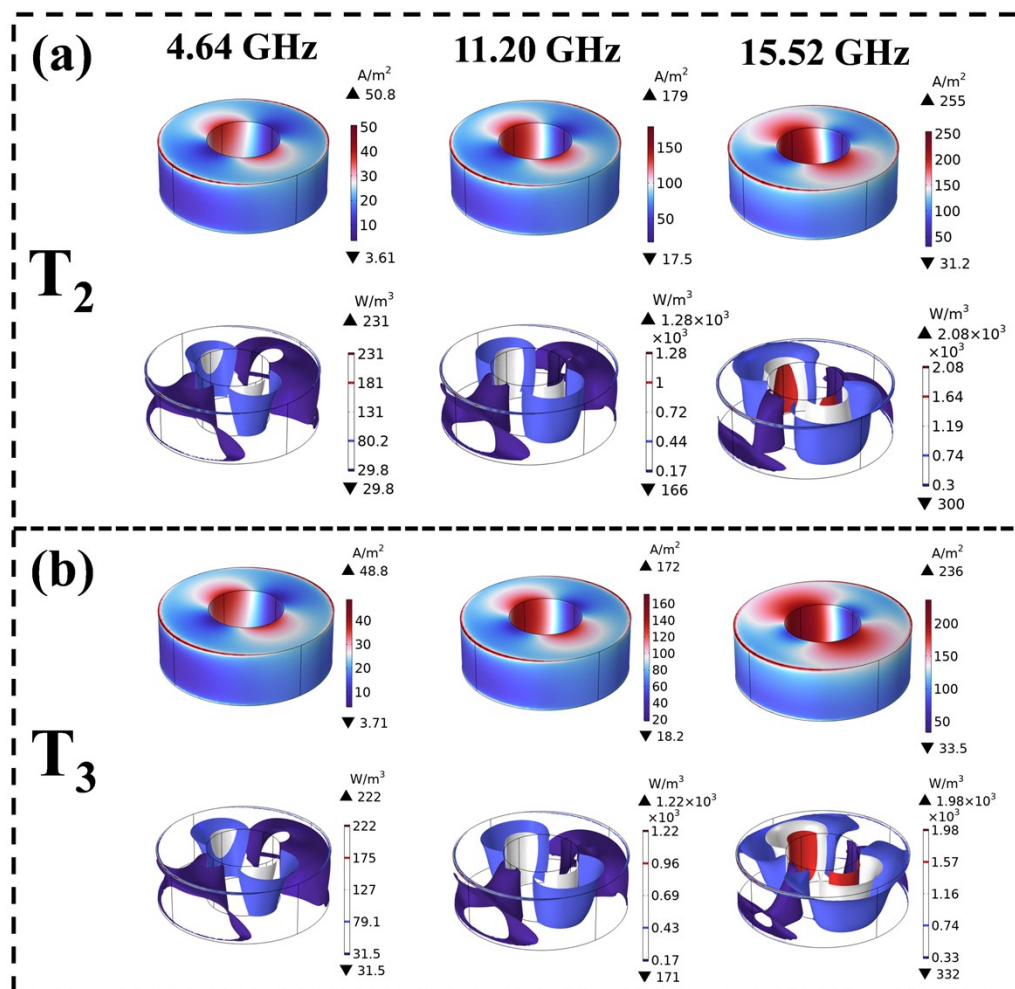
Sample	Name	Peak	FWHM	Area(P)	Atomic
		BE	eV	CPS.eV	%
T ₂	Si	100.98	3.14	336090.07	28.76
	C	284.8	3.57	536045.75	46.06
	Co	780.80	6.81	56376.37	0.88
T ₃	Si	101.12	3.08	362756.91	41.25
	C	284.8	3.62	504052.08	53.71
	Co	780.98	6.46	130252.74	1.14
T ₄	Si	101.44	3.68	435887.36	32.06
	C	284.8	3.60	458904.36	33.89
	Co	781.03	3.89	28782.36	0.50



Figs. S4 (a) ~ (d) shows the Cole-Cole plots for the T₁, T₂ and T₅ samples.



Figs. S5 (a) ~ (c) shows the impedance matching plots for samples T₁, T₂, and T₅ $|\Delta| \leq 0.4$ area, respectively.



Figs. S6 (a) and (b) shows the surface current density and volume loss density plots of the T_2 and T_3 samples at different frequencies.