

Electronic Supplementary Information

Enhanced Microwave Absorption of Coral-like Co@Co₇Fe₃ at Ultralow Filler Loading

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Table S1 Comparison of saturation magnetization of different magnetic materials

Samples	Ms/emu·g ⁻¹	Ref
Ni	25	[39]
FeNi ₃	40	[40]
Fe ₃ O ₄	68	[41]
Co	90	[42]
CoFe ₂ O ₄	118	[43]
CoFe	120	[44]
Fe	177	[45]
Co ₇ Fe ₃	180	[46]

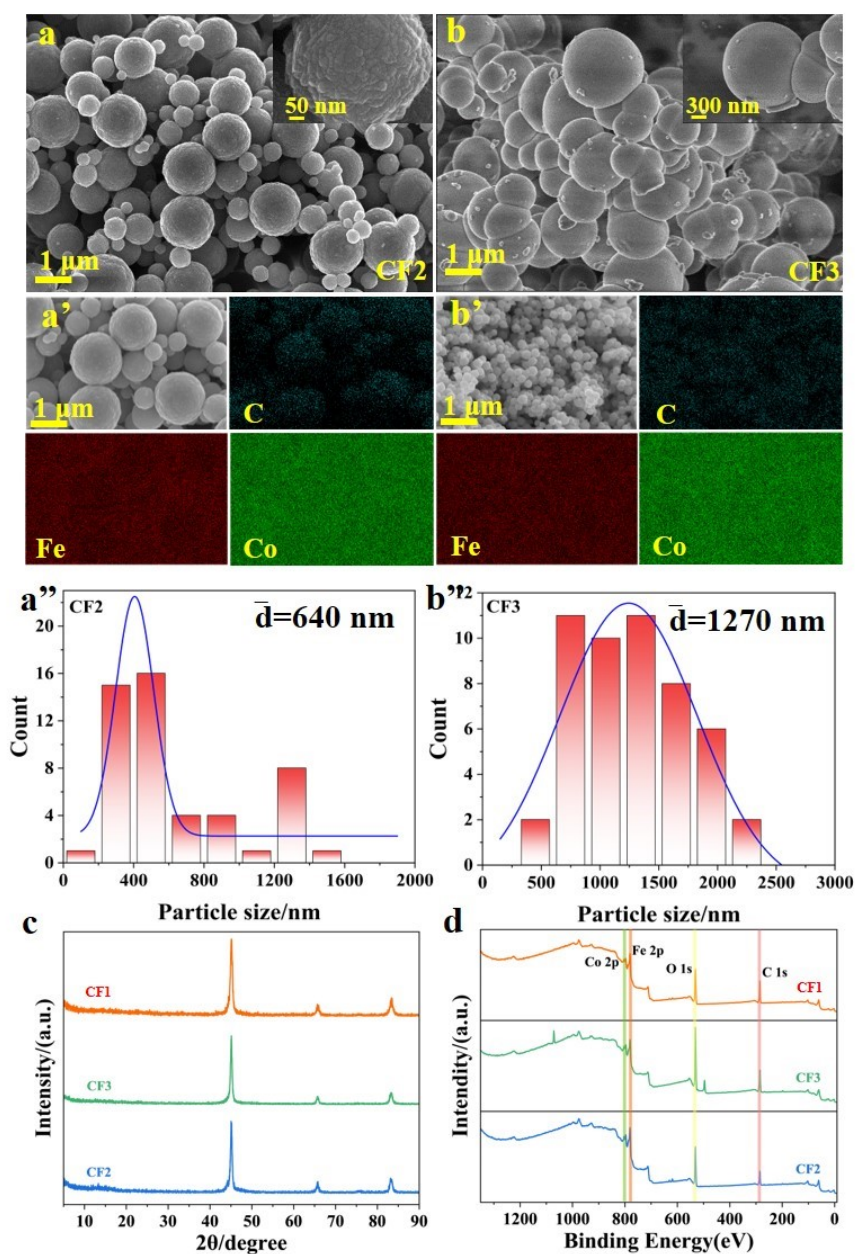


Figure S1 SEM images (a-b), EDS (a'-b'), statistical distribution (a''-b''), XRD spectra (c), XPS spectra (d) of CF.

Table S2 Element ratio of CF in EDS spectra.

Sample	C	O	Fe	Co
CF1	21.12	9.99	16.21	52.67
CF2	26.07	10.31	16.92	46.70
CF3	32.24	18.14	11.85	37.76

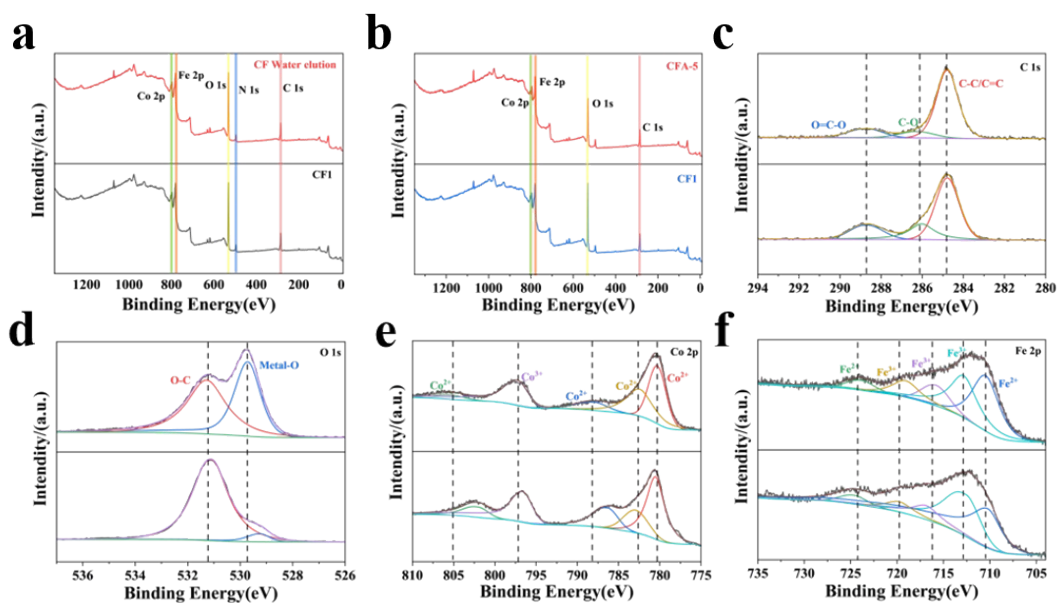


Figure S2 The XPS survey spectra (a) and high-resolution XPS spectra of C1s (b), O1s (c), Co 2p (d) and Fe 2p (e) for CF and CFA-5.

Table S3 Element ratio of CFA in XPS spectra.

Sample	C	O	Fe	Co
CF1 only with water washing	64.52	24.97	3.47	7.03
CF1	33.34	45.59	6.02	13.23
CFA-5	34.32	43.68	6.61	13.39

Table S4 2 θ , half-peak width (β), and grain size (D) of CF and CFA

Samples	2 θ	β	D/nm
CF1	45.18	0.59	14.39
CFA-4	45.02	0.55	15.46
CFA-5	45.18	0.51	16.50
CFA-6	45.20	0.38	22.16
CFA-7	45.12	0.28	30.08
CFA-8	45.00	0.25	33.83

Table S5 Characteristics of Pores in CF and CFA.

Samples	BET (m ² ·g ⁻¹)	Pore volume (cm ³ ·g ⁻¹)	Average pore size (nm)
CF1	9.30	0.024	18.93
CFA-4	3.38	0.0085	10.25
CFA-5	3.29	0.0075	10.97
CFA-6	2.87	0.0064	10.25
CFA-7	2.70	0.0050	9.69
CFA-8	2.03	0.0029	8.21

Table S6 Fe、Co mass ratio of CFA calculated by ICP-OES.

Sample	Fe	Co
CF1	18.38%	67.48%
CFA-4	20.16%	75.52%
CFA-5	20.44%	76.48%
CFA-6	20.55%	76.49%
CFA-7	20.62%	77.17%
CFA-8	20.66%	77.77%

Table S7 Element ratio of CFA in EDS spectra.

Sample	C	O	Fe	Co
CFA-4	25.32	23.57	12.37	38.75
CFA-5	28.98	16.52	13.02	41.48
CFA-6	31.74	9.15	14.31	44.80
CFA-7	22.01	7.68	15.81	52.86
CFA-8	23.71	7.61	16.65	53.67

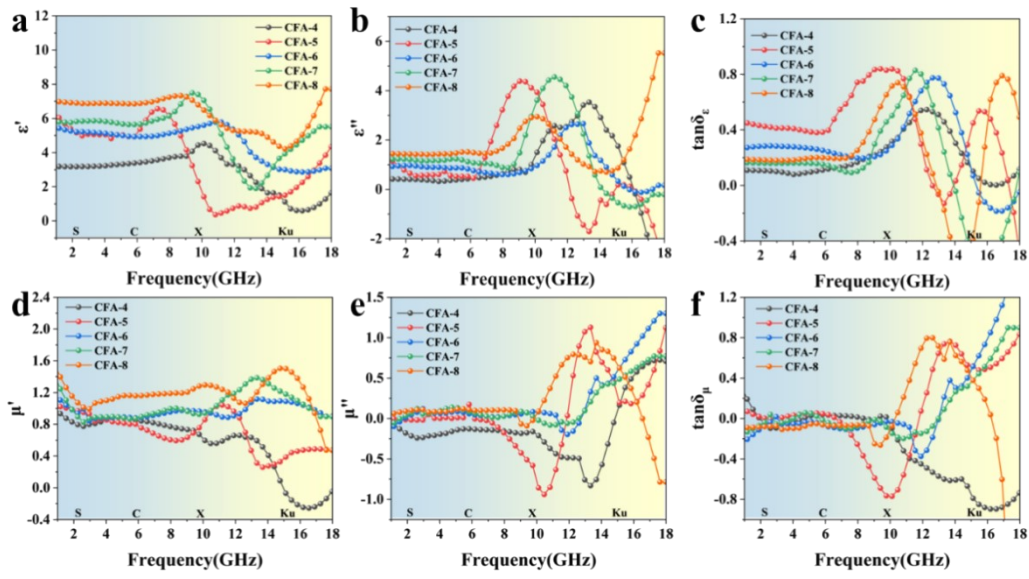


Figure S3 (a,d) ϵ' , (b,e) ϵ'' , (c,f) $\tan\delta_\epsilon$, (g) μ' , and (h) μ'' , and (i) $\tan\delta_\mu$ of CFA.

Table S8 Electrical conductivities of different samples.

Samples	Electrical conductivity (S/cm)
CF1	0.03
CFA-4	1.85
CFA-5	282.14
CFA-6	364.89
CFA-7	461.98
CFA-8	559.12

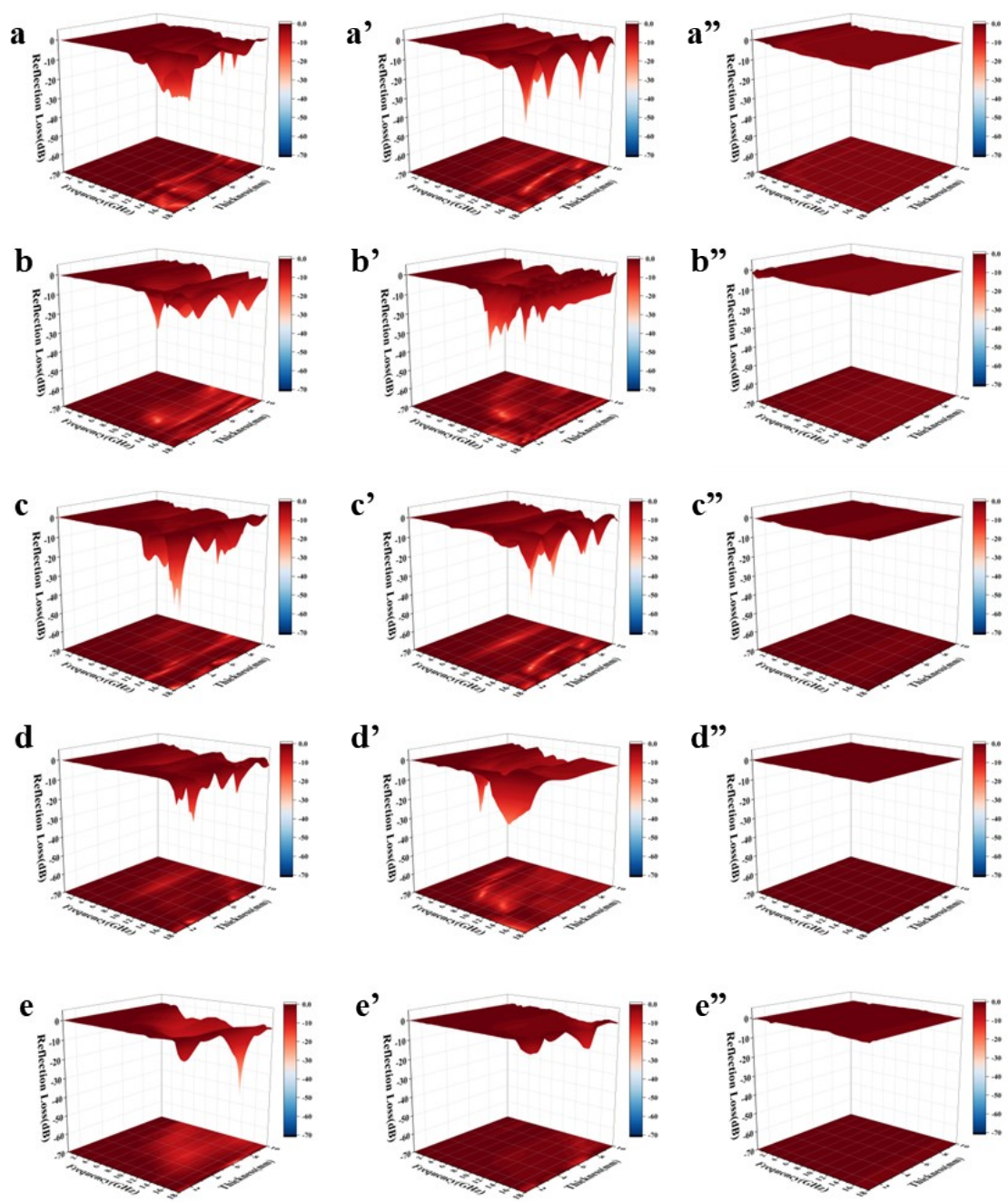


Figure S4 The 3D images of CFA-4, CFA-5, CFA-6, CFA-7, CFA-8 at the filler ratio of 2% (a-e), 10% (a'-e'), 50% (a''-e'').

Table S9 The summary of RL_{min} of CFA at different filler loading.

Sample	RL_{min} (dB)	Thickness (mm)	Filler loading (%)
CFA-4	-24.53	9.82	2%
CFA-5	-23.02	3.18	2%
CFA-6	-35.62	1.41	2%
CFA-7	-21.20	2.69	2%
CFA-8	-35.44	6.57	2%
CFA-4	-29.85	1.61	10%
CFA-5	-28.56	1.02	10%
CFA-6	-35.70	3.52	10%
CFA-7	-25.55	3.35	10%
CFA-8	-11.68	6.82	10%
CFA-4	-2.23	4.24	50%
CFA-5	-3.83	2.12	50%
CFA-6	-1.82	1.01	50%
CFA-7	-0.93	1.13	50%
CFA-8	-1.88	1.20	50%

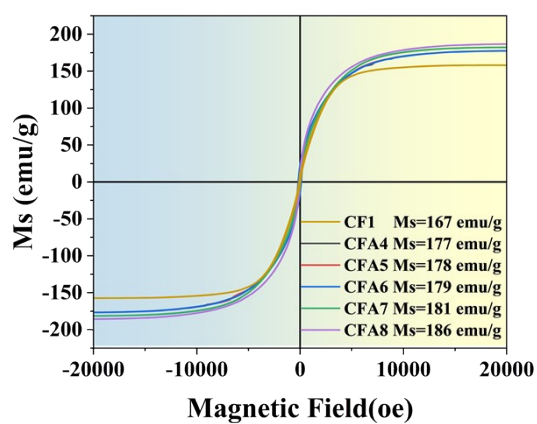


Figure S5 Magnetic hysteresis loops of CF1 and CFA.