Supporting Information for

Hierarchical Magnetic Network Constructed by CoFe Nanoparticles Suspended within "Tubes on Rods" Matrix Toward Enhanced Microwave Absorption

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Supplementary Figures and Table

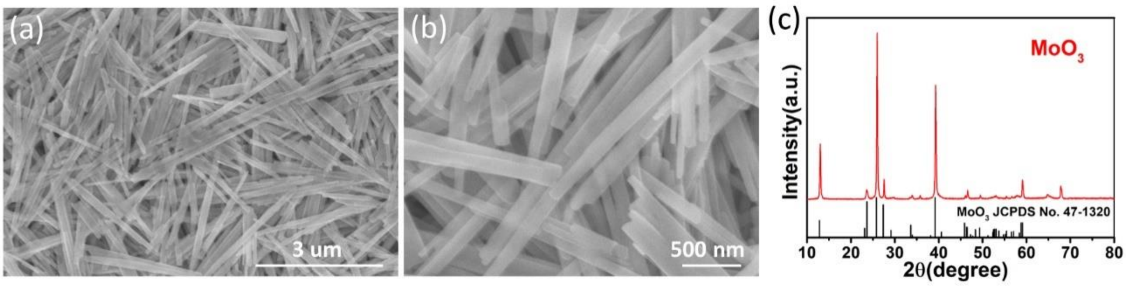

Fig. S1 a, b SEM images and **c** XRD patterns of MoO_3 samples

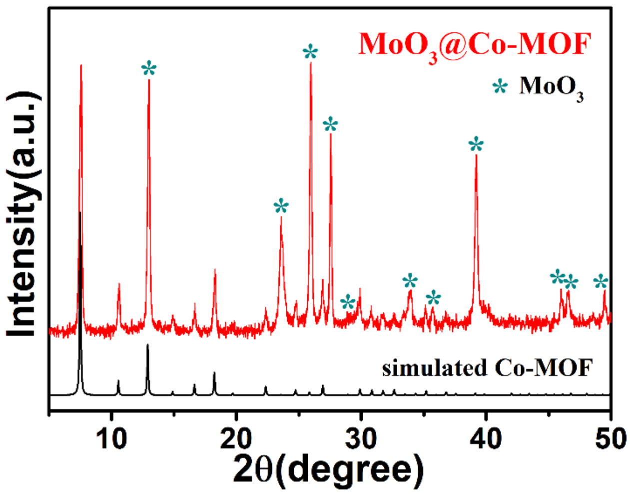

Fig. S2 XRD patterns of MoO_3@Co-MOF

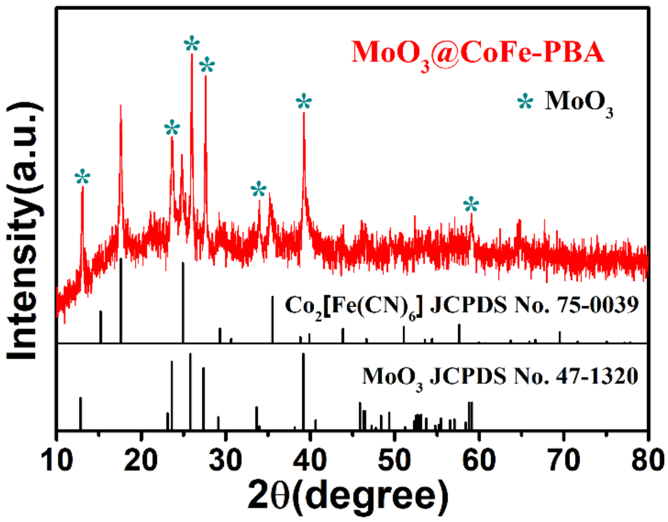

Fig. S3 XRD patterns of MoO_3@hollow-CoFe-PBA samples

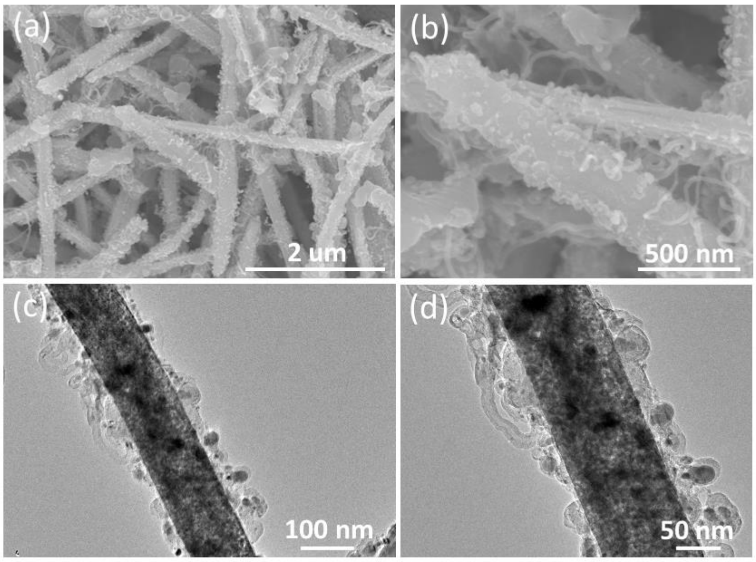

Fig. S4 a, b SEM **c, d** TEM images of Mo_2N@Co/CNT samples

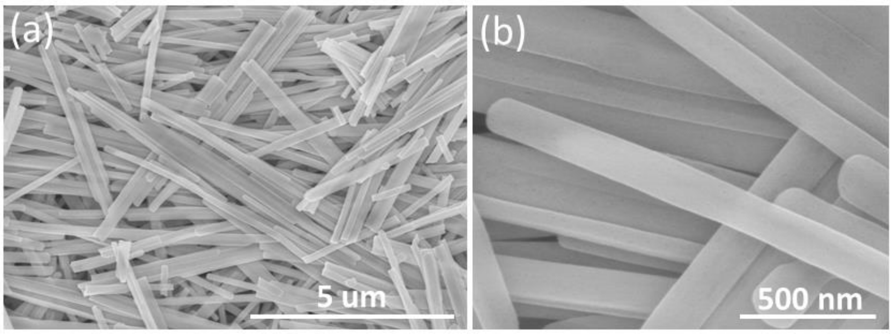

Fig. S5 a, b SEM images of Mo_2N samples

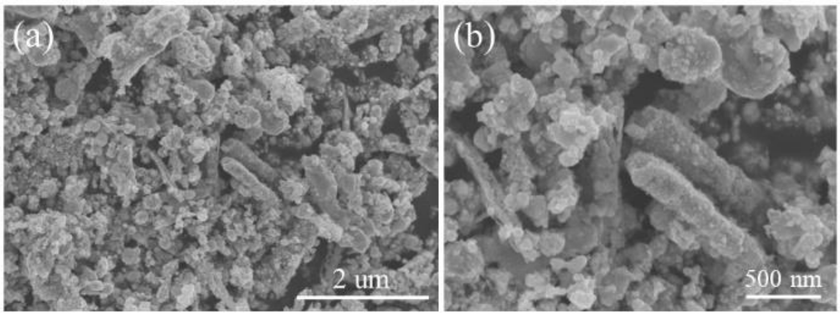

Fig. S6 a, b SEM images of samples calcined at 700 °C We have also prepared the sample obtained under 700 °C. As displayed in Fig. S6, MoO_3@hollow-CoFe-PBA samples were unstable at 700 °C and decomposed into irregular structure. Even some samples could retain rod-like structure, there were no CNTs on the surface.

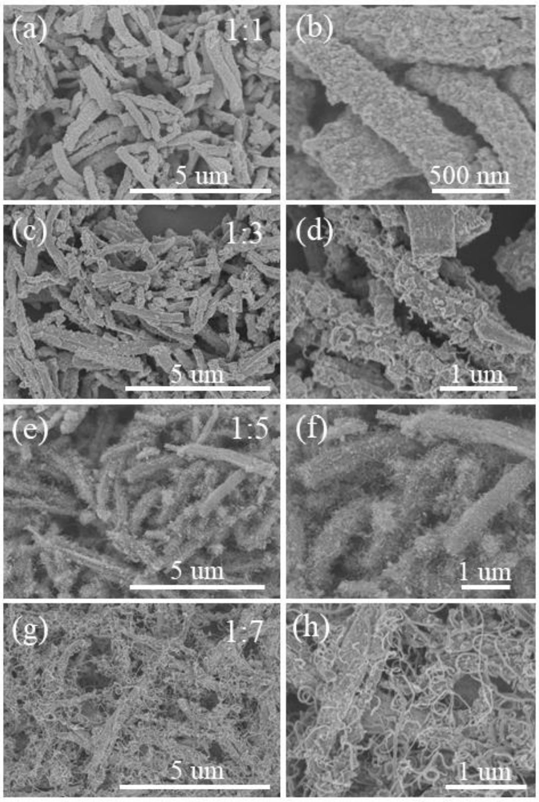

Fig. S7 SEM images of samples calcined under different weight ratio of MoO_3@hollow-CoFe-PBA to melamine: **a-b** 1:1, **c-d** 1:3, **e-f** 1:5, **g-h** 1:7

We have prepared samples under different weight ratio of MoO_3@hollow-CoFe-PBA to melamine, including 1:1, 1:3, 1:5, and 1:7. Under the carbonization of MoO_3@hollow-CoFe-PBA with the same weight of melamine (1:1), there is no CNTs produced on the Mo_2N rod due to less melamine as carbon sources. Increase the content of melamine (1:3), few CNTs can be seen on the Mo_2N rod. When the weight ratio of MoO_3@hollow-CoFe-PBA to melamine is 1:5, a large number of CNTs are produced and deposited on the core of Mo_2N rod, forming Mo_2N@CoFe@C/CNT core-shell structure. Increasing the weight ratio to 1:7, too many CNTs are produced and core-shell structure cannot be maintained.

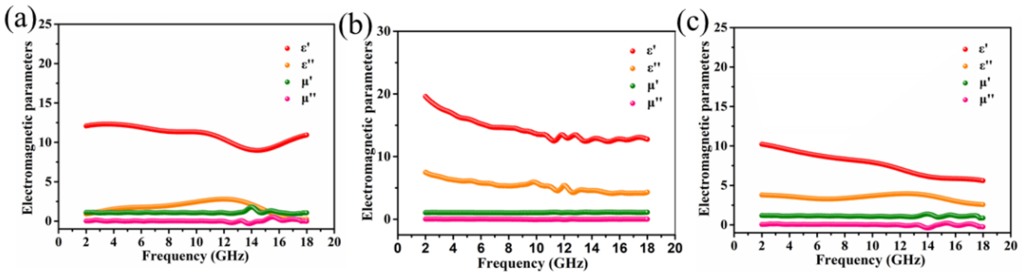

Fig. S8 Electromagnetic parameters of **a** Mo_2N, **b** Mo_2N@Co/CNT and **c** Mo_2N@CoFe@C/CNT samples

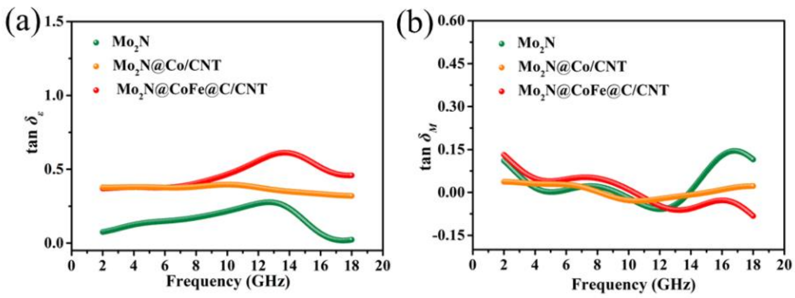

Fig. S9 **a** Dielectric loss tangent and **b** magnetic loss tangent of Mo_2N, Mo_2N@Co/CNT, and Mo_2N@CoFe@C/CNT samples

Table S1 Microwave absorption performance of metal/C absorbents and molybdenum-based materials in previous references and this work.

Absorbents	Thickness (mm)	Maximum RL (dB)	EAB (GHz)	Refs.
FeCo/C/$BaTiO_3$	2.0	-41.7	4.2	[S1]
NiFe@C	2.8	-51	3.97	[S2]
Co/NPC@Void@CI	2.2	-49.2	6.72	[S3]
MOF (Fe)/PANI	2.0	-41.4	5.5	[S4]
MWCNT/Fe	4.3	-39.0	2.7	[S5]
Fe/C	3.0	-36.0	0.9	[S6]
Fe/C	2.0	-22.6	5.3	[S7]
Co/N-C NF	2.0	-41.7	4.2	[S8]
CoZn@NCNTHS/G	1.5	-47.3	4.0	[S9]
CMT@CNT/Co	2.0	-52.2	5.1	[S10]
C@MoO_2/G	1.5	-35.4	4.5	[S11]
Mo_2C@C	1.9	-48.0	4.1	[S12]
Mo_2C/C NCs	2.6	-49.2	4.6	[S13]
Mo_2N@CoFe@C/CNT	2.0	-53.5	5.0	This work

Supplementary References

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