Supporting Information

Constructing a smooth dense SiO_2 layer by adjusting the hydrolysis rate to promote the magnetic properties of soft magnetic composites

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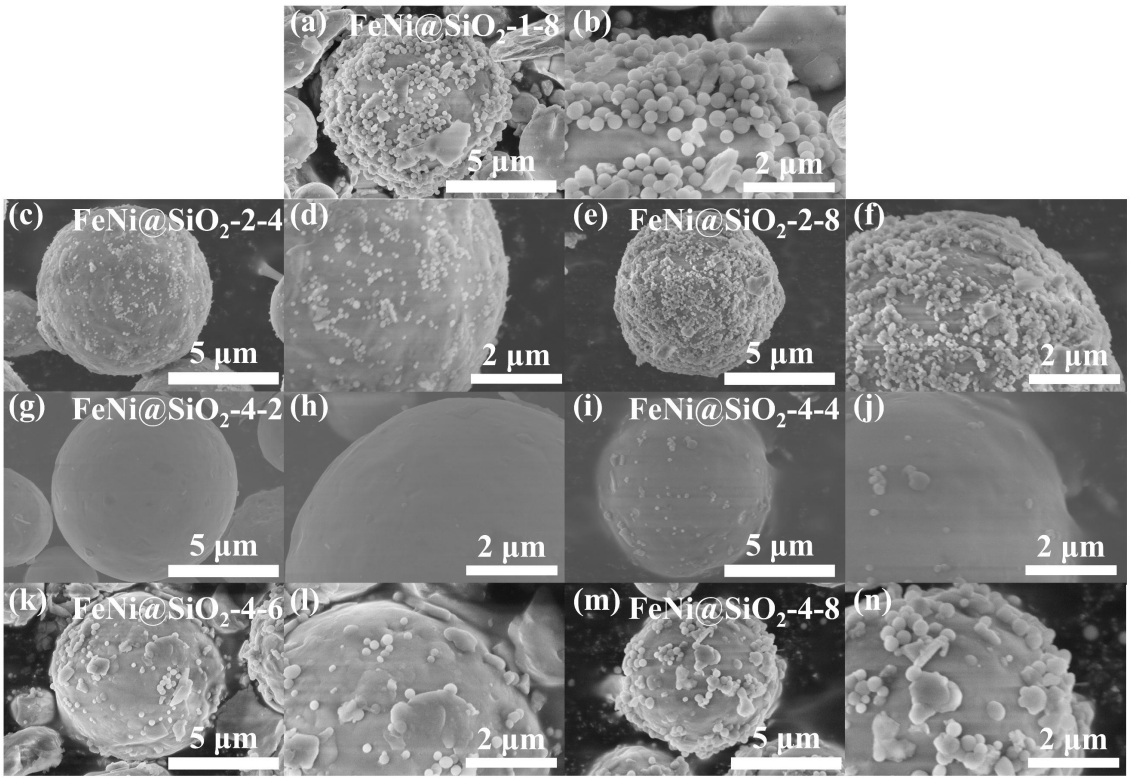

Fig. S1 SEM images of (a, b) FeNi@SiO_2-1-8, (c, d) FeNi@SiO_2-2-4, (e, f) FeNi@SiO_2-2-8, (g, h) FeNi@SiO_2-4-2, (i, j) FeNi@SiO_2-4-4, (k, l) FeNi@SiO_2-4-6, and (m, n) FeNi@SiO_2-4-8.

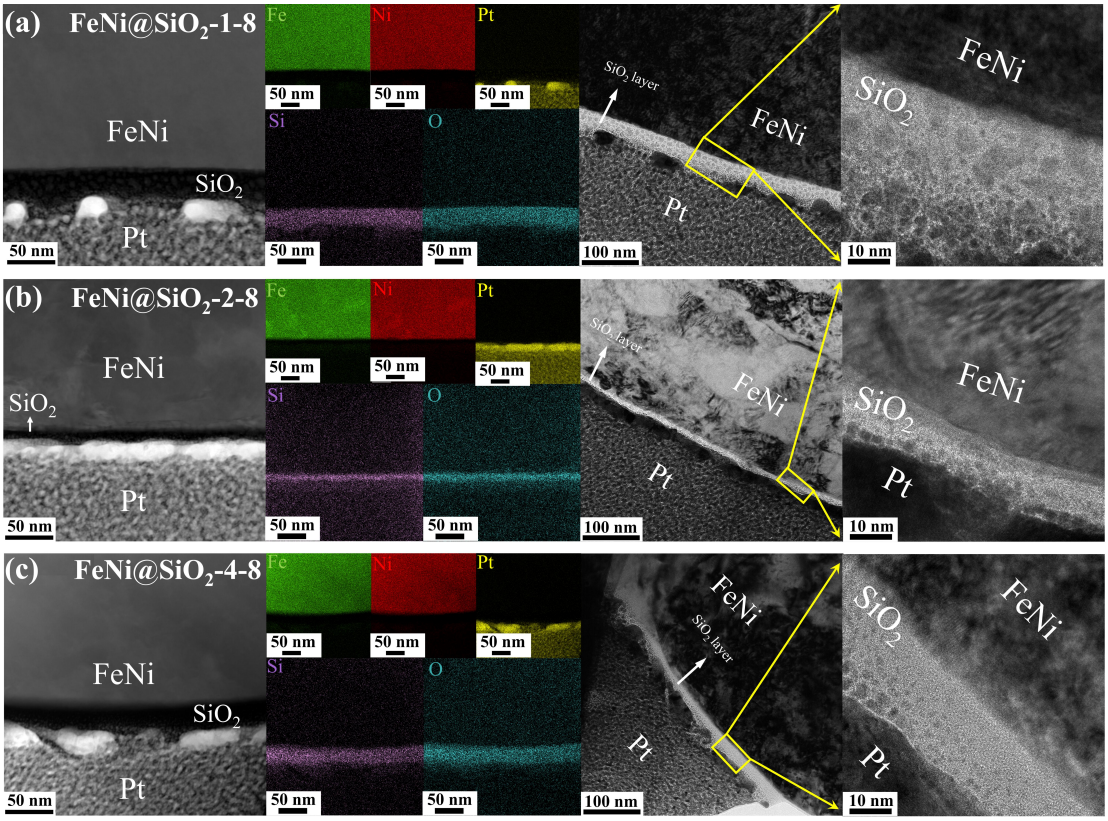

Fig. S2 TEM images and EDS elemental maps of (a) FeNi@SiO_2-1-8, (b) FeNi@SiO_2-2-8, and (c) FeNi@SiO_2-4-8.

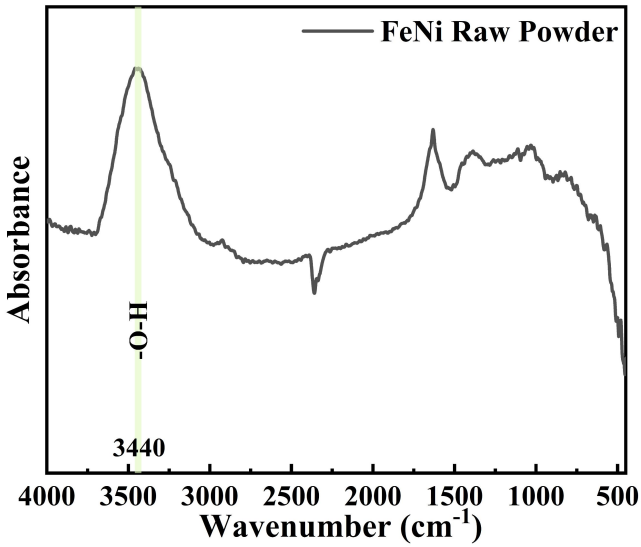

Fig. S3 FTIR spectrum of FeNi raw powder.

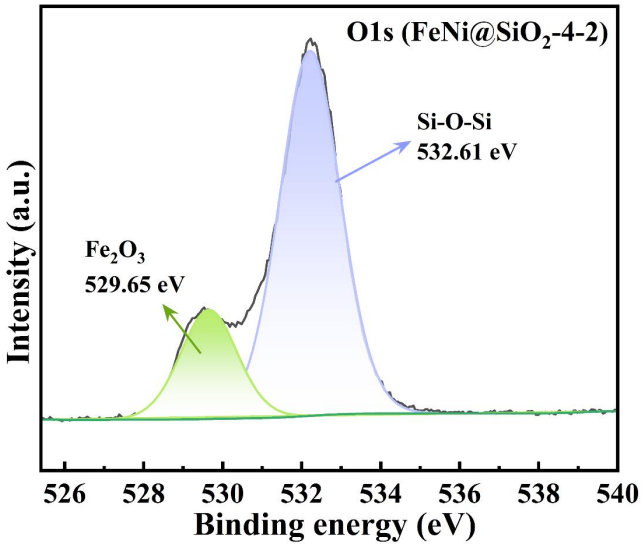

Fig. S4 O 1s spectrum of FeNi@SiO_2-4-2.

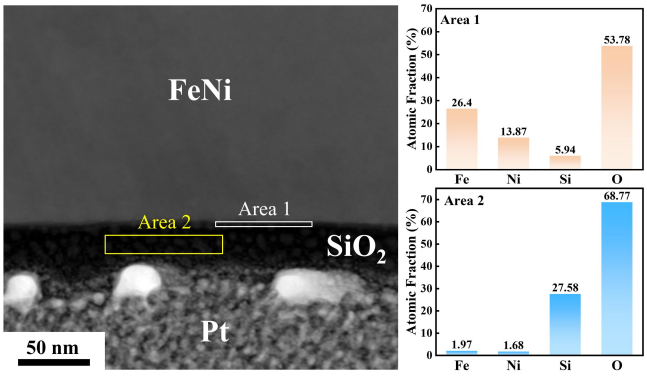

Fig. S5 TEM image of FeNi@SiO_2-1-8 and elemental composition in its specific regions.

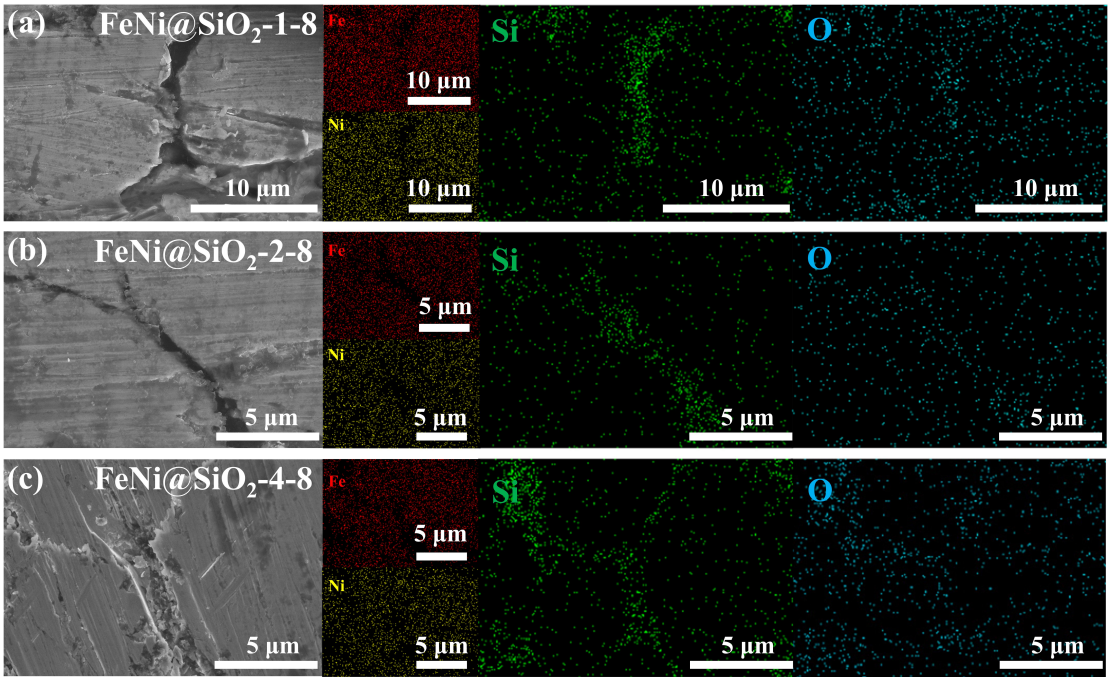

Fig. S6 SEM images and EDS elemental maps of the cross-section of (a) FeNi@SiO_2-1-8, (b) FeNi@SiO_2-2-8, and (c) FeNi@SiO_2-4-8 SMCs.

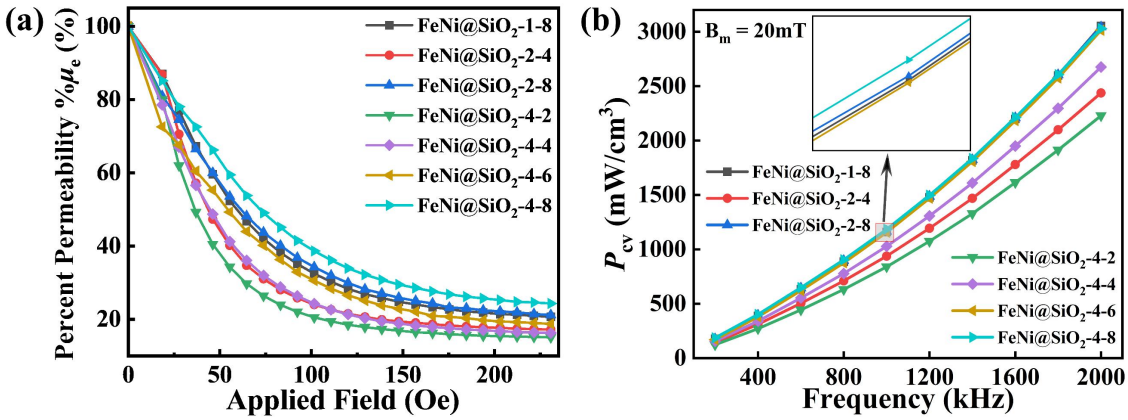

Fig. S7 (a) DC-bias curves and (b) core losses of FeNi@SiO_2 SMCs.

Table S1 Permeability variation rates at 1 MHz of FeNi@SiO_2 SMCs

Permeability variation rates after	FeNi@ SiO_2-1-8	FeNi@ SiO_2-2-4	FeNi@ SiO_2-2-8	FeNi@ SiO_2-4-2	FeNi@ SiO_2-4-4	FeNi@ SiO_2-4-6	FeNi@ SiO_2-4-8
0 weeks (%)	0	0	0	0	0	0	0
2 weeks (%)	0.71	0.52	1.92	0.61	0.51	4.38	1.44
4 weeks (%)	0.38	0.72	1.18	0.27	0.09	4.33	0.97
6 weeks (%)	0.51	0.78	0.44	1.13	0.67	3.21	0.82

Table S2 Comprehensive performance of as-prepared FeNi@SiO_2 SMCs

Sample	Permeability @ 1 MHz	Permeability @ 10 MHz	$\%\mu_e$ @ 100 Oe (%)	$\%\mu_e$ @ 200 Oe (%)	tan $\delta\mu$ @ 10 MHz	P_{cv} @ 1 MHz (mW/cm^3)
FeNi@SiO_2-1-8	16.14	16.31	32.44	21.38	0.022	1159.32
FeNi@SiO_2-2-4	21.08	21.25	23.97	17.67	0.024	937.35
FeNi@SiO_2-2-8	13.97	14.13	34.24	22.15	0.020	1164.6
FeNi@SiO_2-4-2	21.55	21.95	20.51	15.38	0.029	839.62
FeNi@SiO_2-4-4	17.85	18.10	24.24	16.74	0.023	1028
FeNi@SiO_2-4-6	15.69	15.80	30.56	19.37	0.018	1155.9
FeNi@SiO_2-4-8	12.99	13.13	38.64	25.24	0.017	1184