Supporting Information

Distinctly plasmon resonance enhanced microwave absorption of strawberry-like Co/C/Fe/C core–shell hierarchical flowers via engineering the diameter and interparticle spacing of Fe/C nanoparticles

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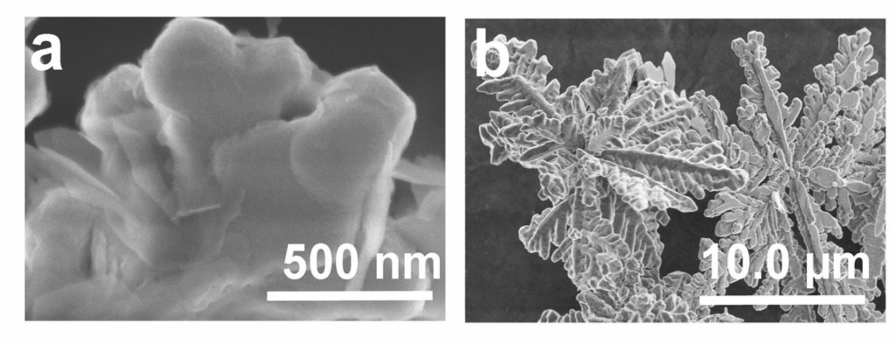

Fig. S1. SEM images of Co HFs.

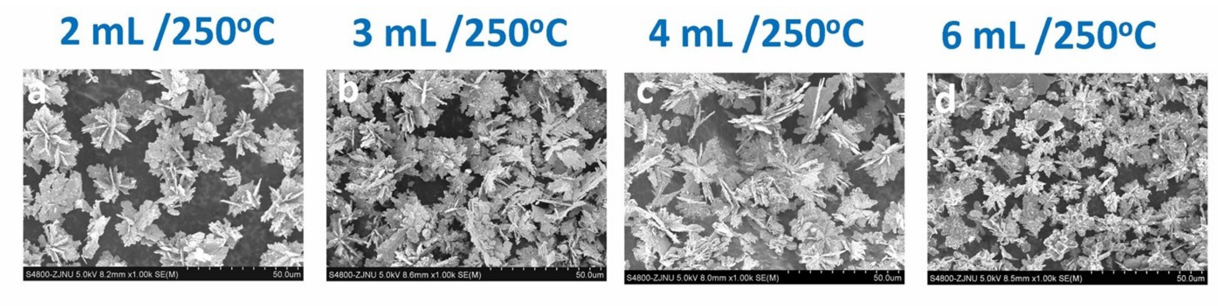

Fig. S2. SEM images of Co/C/Fe/C CSHFs formed under various *δ*.

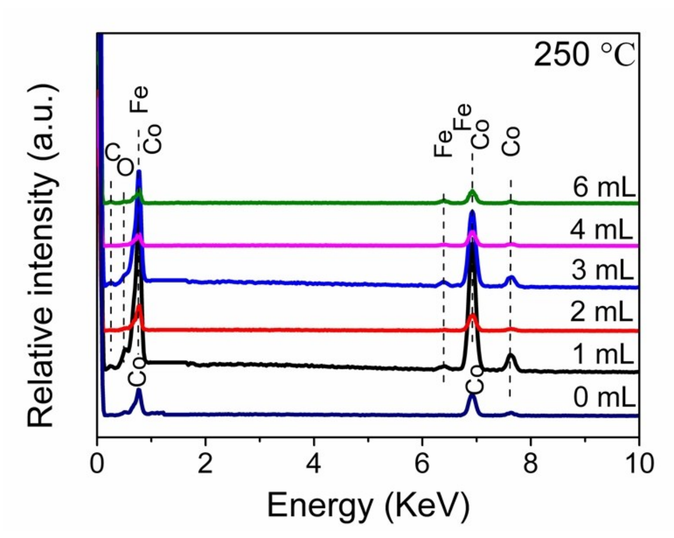

Fig. S3. EDX spectra of Co/C/Fe/C CSHFs formed under various *δ*

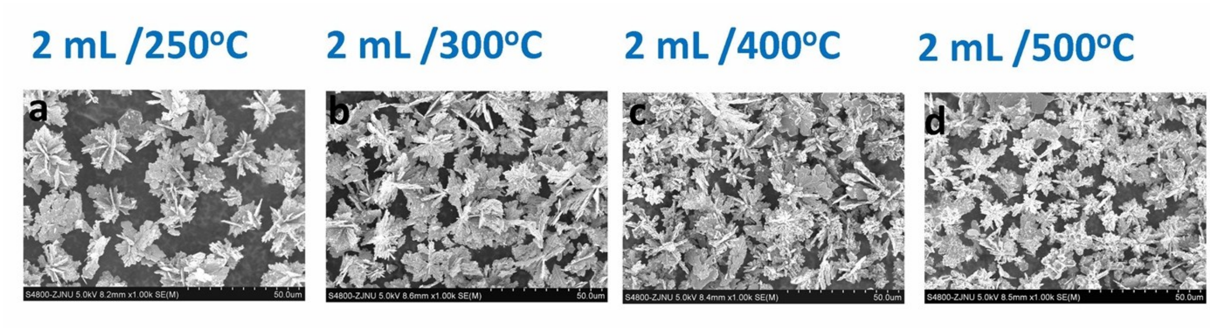

Fig. S4. SEM images of Co/C/Fe/C CSHFs formed under various T_d.

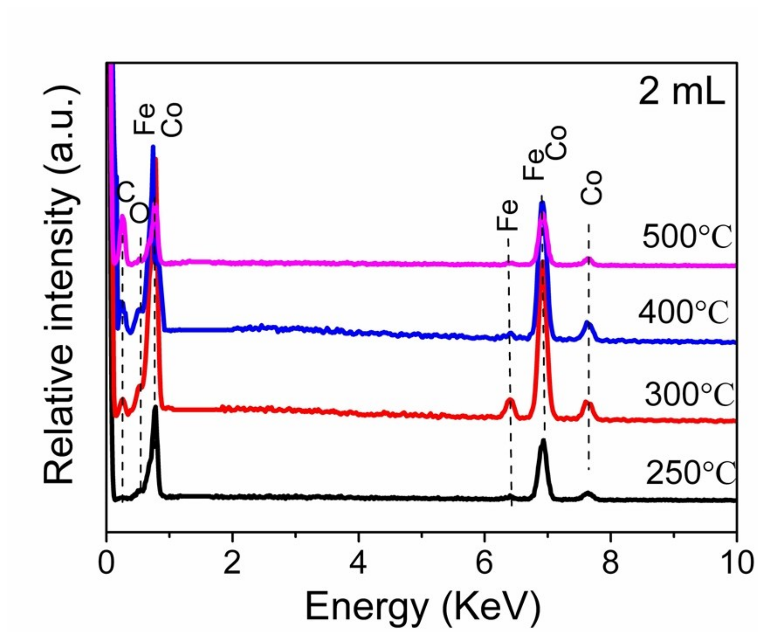

Fig. S5. EDX spectra of Co/C/Fe/C CSHFs formed under various T_d.

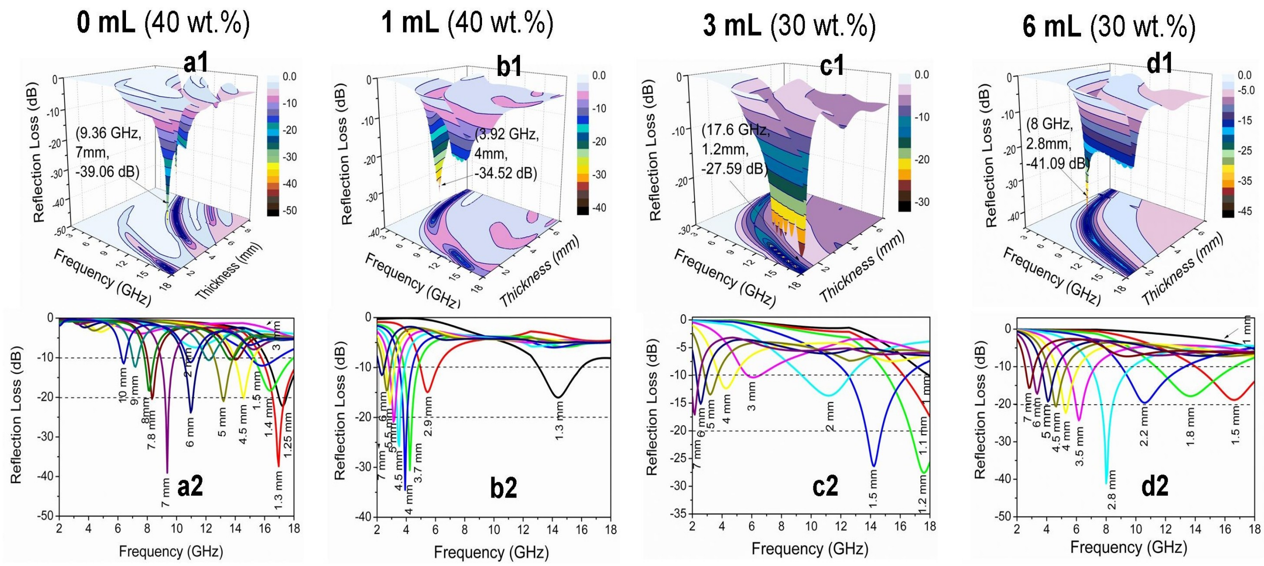

Fig. S6. (a1, b1, c1, d1) calculated 3D plots and (a2, b2, c2, d2) reflection loss curves of the paraffin composites containing samples with various mass fractions formed under various $Fe(CO)_5$ volumes.

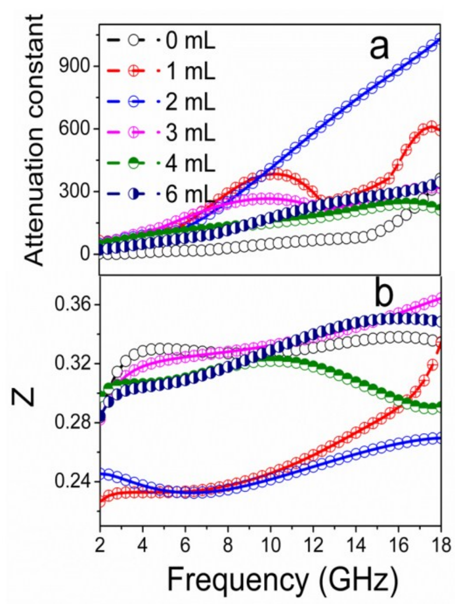

Fig. S7. (a) Attenuation constant (α) and (b) the modulus of the normalized characteristic impedance (*Z,* present Impedance matching) of the samples obtained under (a) various δ.

In general, microwave absorption is determined by impedance matching and attenuation constant (α). The α is calculated using the equation: $\alpha = \frac{\sqrt{2}\pi f}{c}\sqrt{(\mu''\varepsilon'' - \mu'\varepsilon') + \sqrt{(\mu'\varepsilon'' + \mu''\varepsilon')^2 + (\mu''\varepsilon'' - \mu'\varepsilon')^2}}$. The high α means that more EM waves are absorbed by MAMA via converting them into thermal energy or interfere. Seen from Fig. S7a, the α decreased in the following order: $\alpha_2 > \alpha_1 > \alpha_3 > \alpha_6 > \alpha_4 > \alpha_0$. These results indicate that Co/C/Fe/C CSHFs with strawberry-like surface have much higher α than pure Co HFs owing to plasmon resonance and coupling caused by heterostructures with the strawberry-like surface. Impedance matching is defined by the modulus of the normalized characteristic impedance (Z), which is calculate using the equation: $Z = |Z_1 / Z_0|$, where $Z_1 = Z_0\sqrt{\mu_r / \varepsilon_r}$. If Z value is close to 1, impedance matching will be high. In this case, more microwaves will enter the absorber without reflection at the air−absorber interface. Z as a function of frequency for all of the samples is shown in Fig. S7b. The Z values vary in the following order: $Z_0 \approx Z_3 \approx Z_6 > Z_4 > Z_1 > Z_2$. Obviously, Co/C/Fe/C CSHFs obtained at d = 3–6 mL has as similar impedance matching to Co HFs.