Electronic Supplementary Information (ESI)

Controllable synthesis of elliptical Fe_3O_4@C and Fe_3O_4/Fe@C nanorings for plasmon resonance-enhanced microwave absorption

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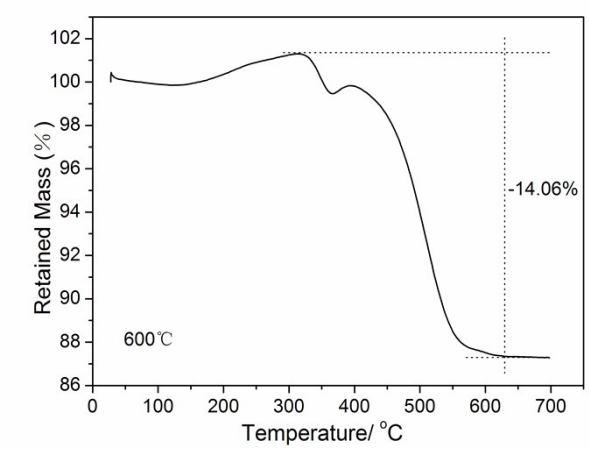

Fig. S1 Thermogravimetric (TG) curves of the sample obtained at 600 °C.

The carbon content of the sample obtained at 600 °C was quantitatively determined by thermogravimetric (TG) analysis (Fig. S1). Heating the materials from room temperature to 700 °C in air produces only Fe_2O_3. From the TG curve, it can be observed that there is a small weight loss below 150 °C due to the remove of adsorbed water and gaseous contents.[1] And two weight increase regions from 150°C to 300°C and 350°C to 400°C are caused by the oxidation of Fe_3O_4 and Fe to Fe_2O_3 when heated in air.[2] The combustion of carbon causes the main weight loss, which begins around 300 °C and completes at about 650°C.[3,4] Based on the analysis above and Fig. S1, the

carbon content of the core-shell sample can be estimated as ~14.06%.

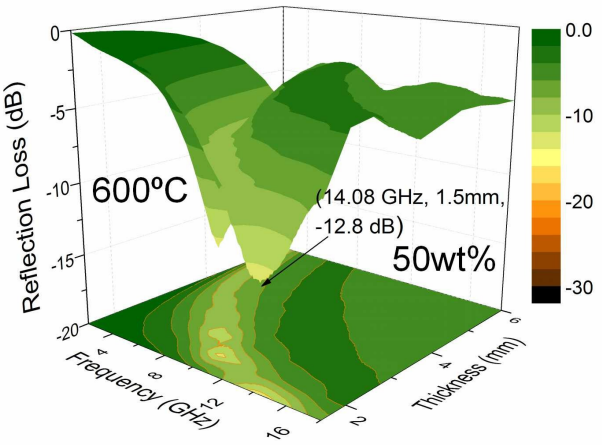

Fig. S2 3D plots of reflection loss for wax composites containing 50 w% NRs formed at 600 °C.

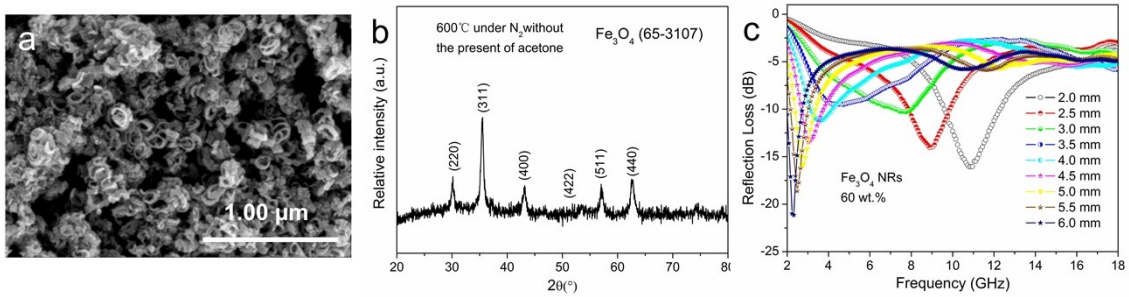

Fig. S3 (a) SEM image and (b) XRD pattern of the sample obtained by sintering the nanosheet precursors at 600 °C for 2 h under N_2 without the present of acetone. (c) Reflection loss curves for wax composites containing 60 wt.% Fe_3O_4 NRs formed at 600 °C.

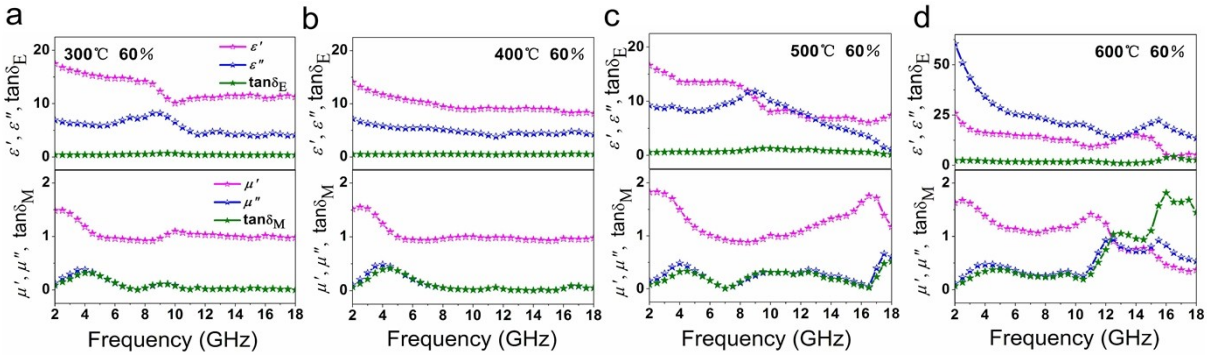

Fig. S4 Frequency dependence of the real (ε') and imaginary (ε'') parts of the relative complex permittivity, the dielectric loss ($\tan\delta_E$), the real (μ') and imaginary (μ'') parts of the relative complex permeability, and the magnetic loss ($\tan\delta_M$) of NRs formed at various t_s. (a) 300 °C, (b) 400 °C, (c) 500 °C, and (d) 600 °C.

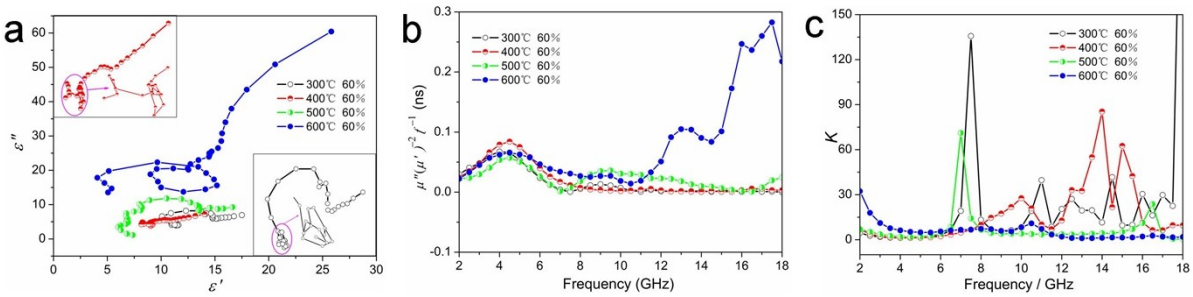

Fig. S5 (a) Cole-Cole semicircles (ε' versus ε''), (b) $\mu''(\mu')^{-2}f^{-1}$ (representing eddy current loss) versus frequency and (c) Matching constant ($K = |\tan\delta_E / \tan\delta_M|$) versus frequency of NRs formed at various *t*.

Reference

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