Supporting Information

Multiscale Assembly of Grape-Like Ferroferric Oxide and Carbon-Nanotubes: A Smart Absorber Prototype Varying Temperature to Tune Intensities

Ming-Ming Lu,[a] Mao-Sheng Cao,*[a] Yi-Hua Chen,[a] Wen-Qiang Cao,[b] Jia Liu,[a] Hong-Long Shi,[b] De-Qing Zhang,[a] Wen-Zhong Wang[b] and Jie Yuan*[b]

[a] School of Material Science and Engineering, Beijing Institute of Technology, Beijing, 100081, China. E-mail: caomaosheng@bit.edu.cn

[b] School of Science, Minzu University of China, Beijing, 100081, China. E-mail: yuanjie4000@sina.com

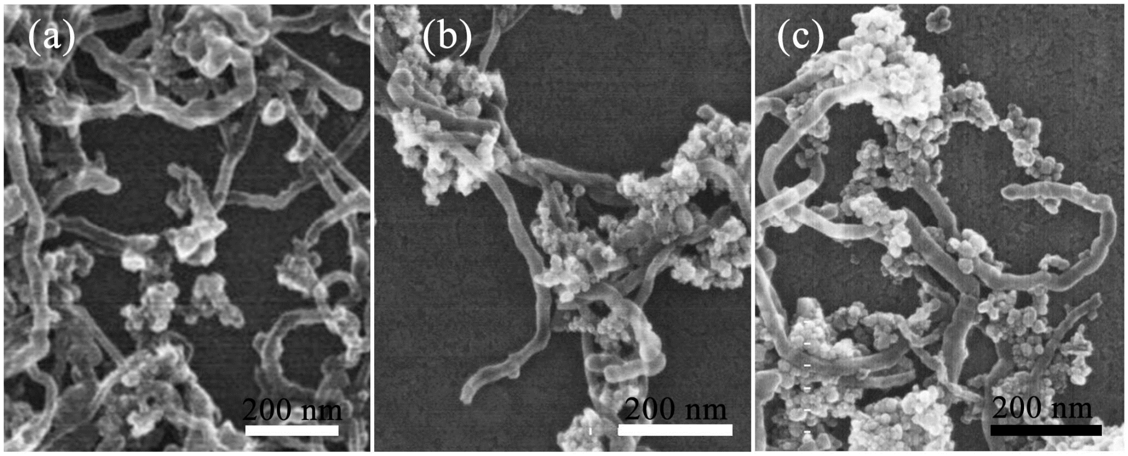

Figure S1. SEM images of (a) Sample Ⅰ, (b) Sample Ⅱ and (c) Sample Ⅲ.

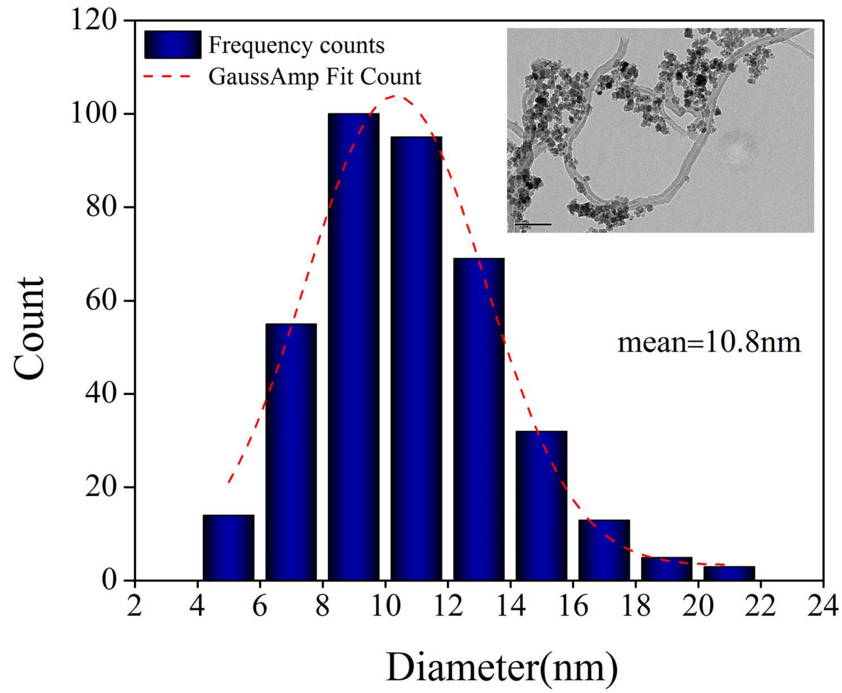

Figure S2. The particle size distribution of Fe_3O_4 nanocrystals.

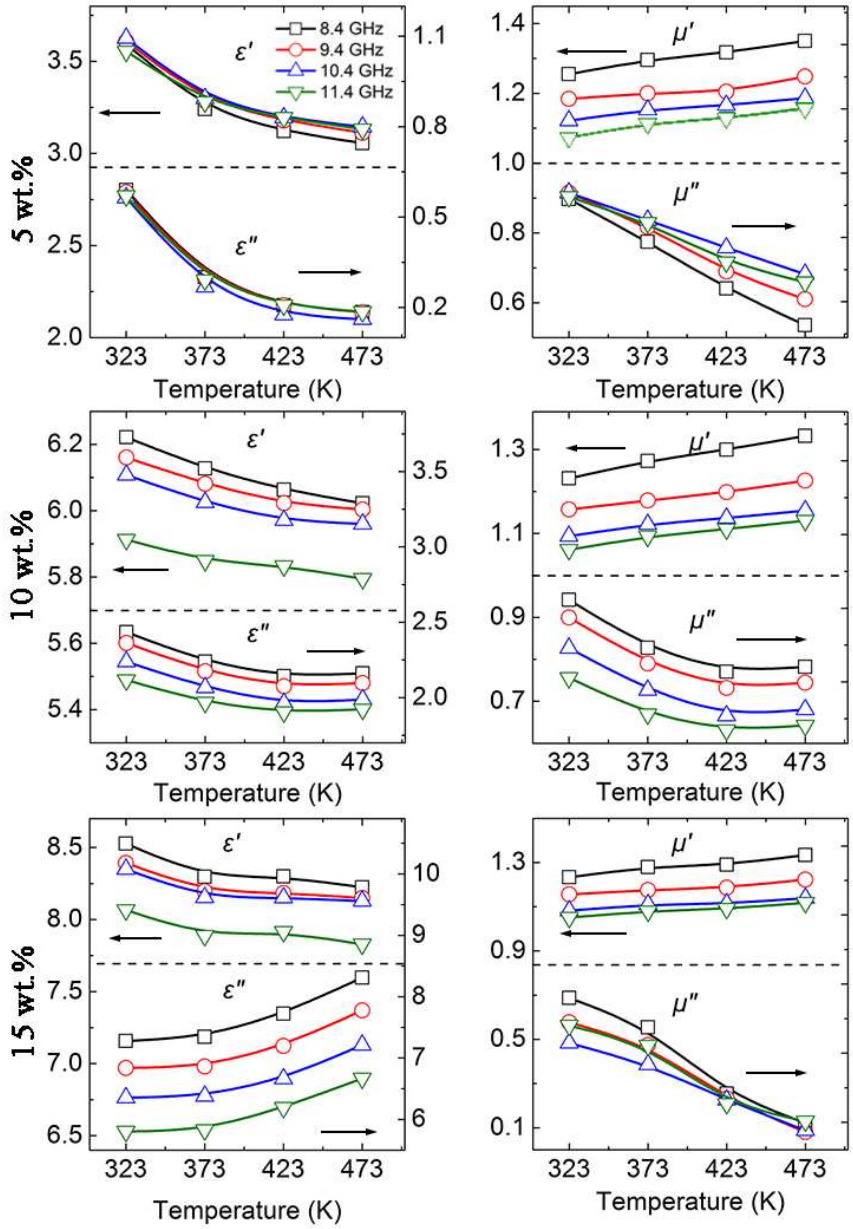

Figure S3. Temperature dependences of the complex permittivity and permeability.

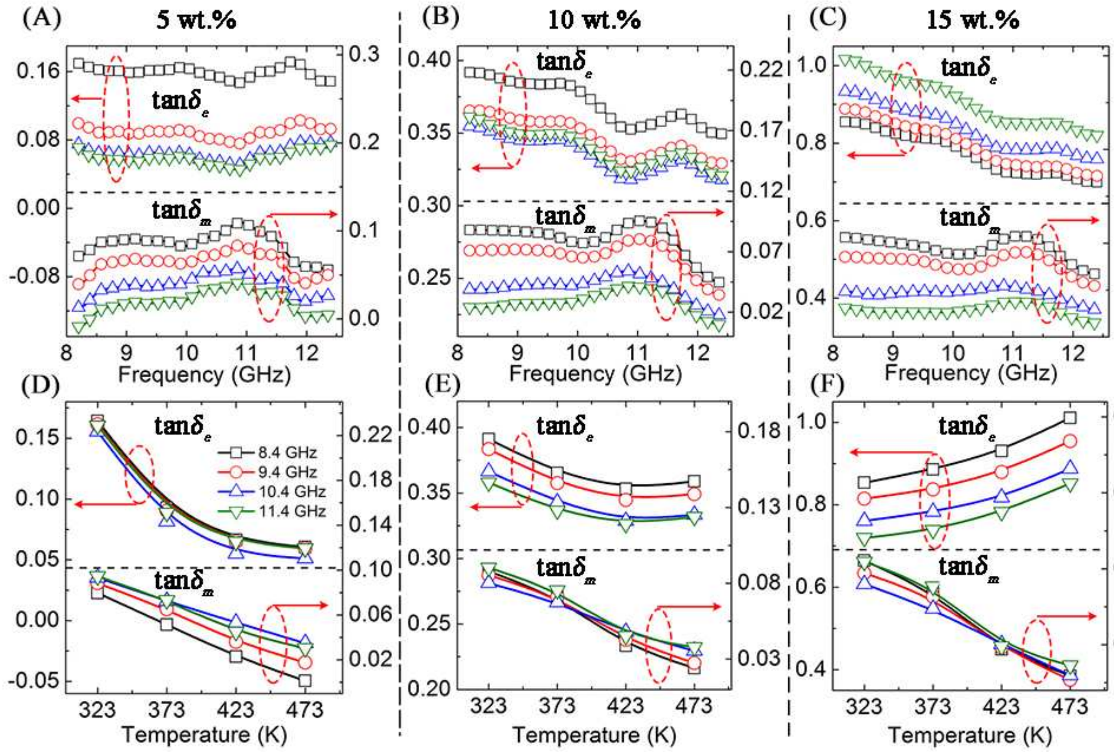

Figure S4. (A, B, C) Frequency dependences of the tanδ_e and tanδ_m at 323 K (black line), 373 K (red line), 423 K (blue line), 473 K (green line); (D, E, F) temperature dependences of the tanδ_e and tanδ_m;

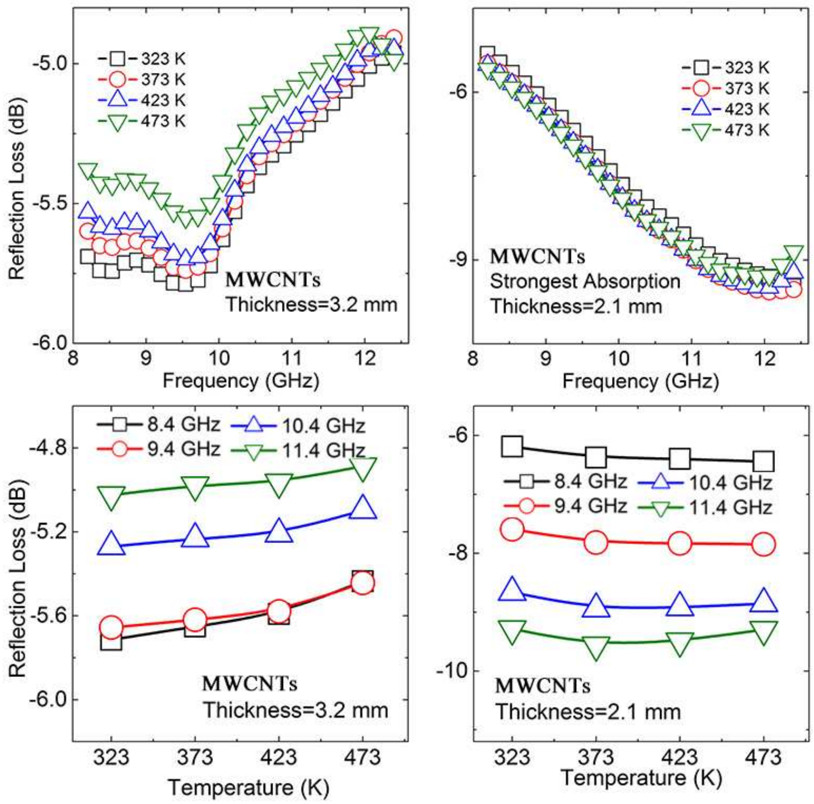

Figure S5. The MA properties of MWCNTs/SiO_2 with 10 wt.% loading to indicate the better MA properties of grape-like Fe_3O_4-MWCNTs/SiO_2.

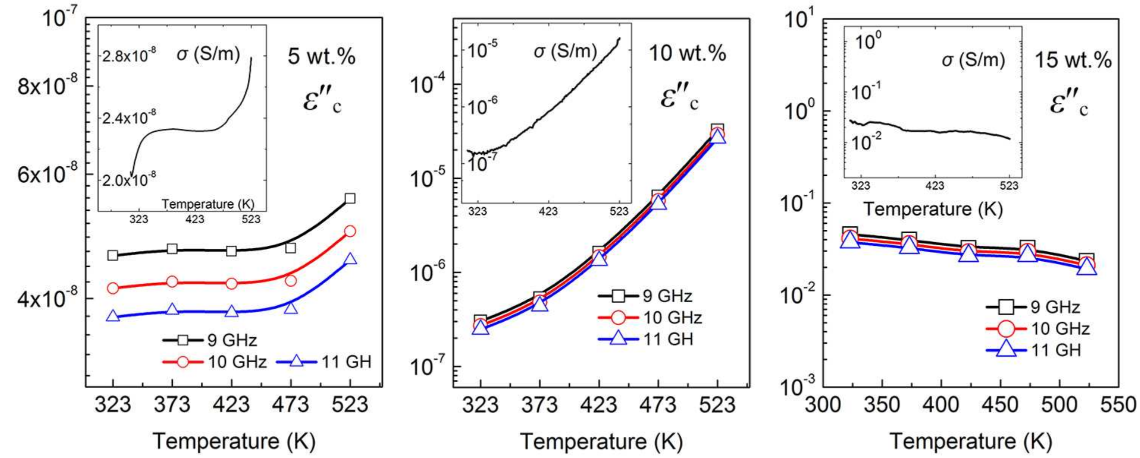

Figure S6. The imaginary permittivity contributed by conductivity of the composites with 5 wt %, 10 wt % and 15 wt % grape-like Fe_3O_4-MWCNTs loading. The three insets are the DC conductivity of the composites with different loading concentrations versus the temperature.

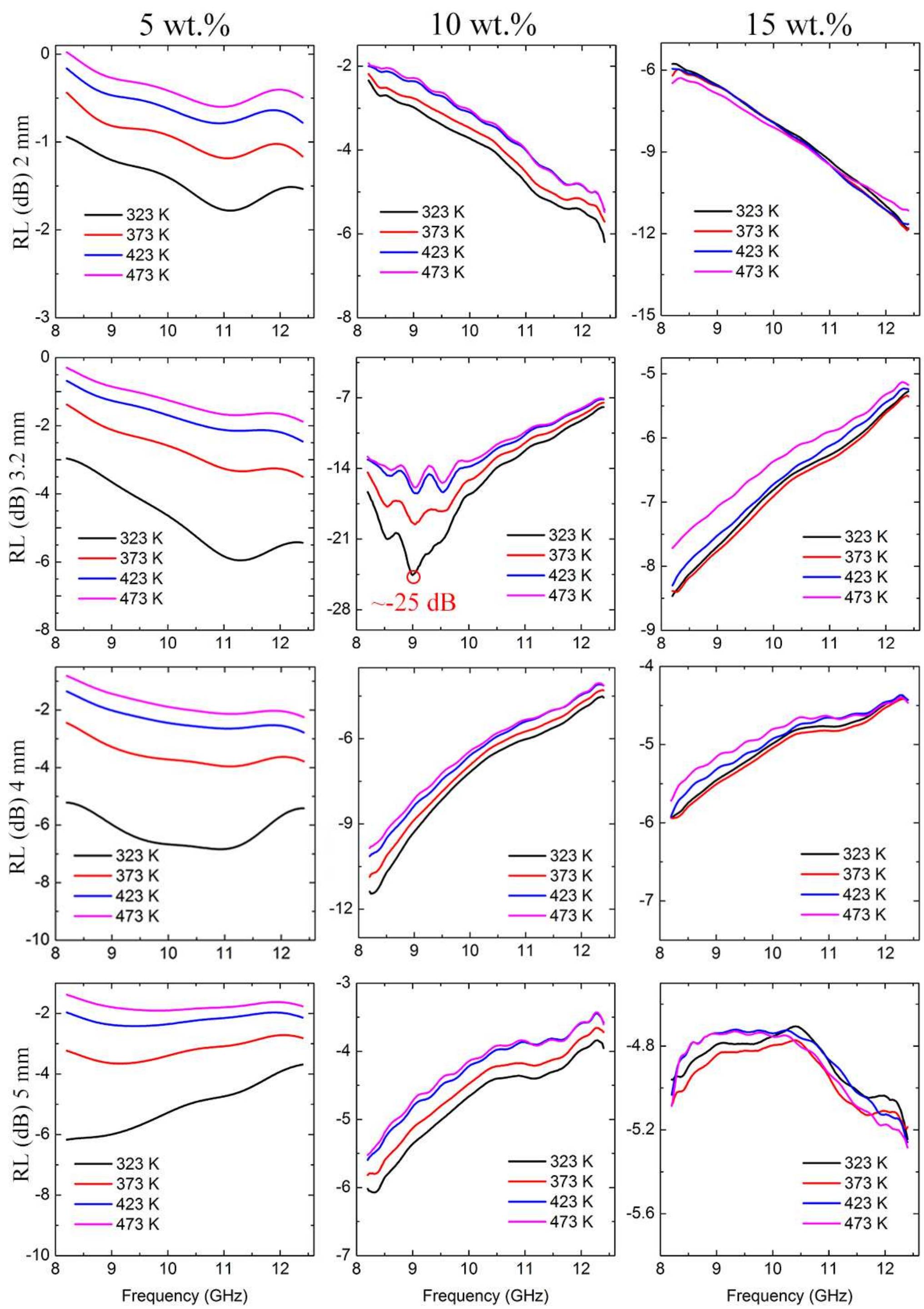

Figure S7. Reflection Loss of the samples with 5 wt.%, 10 wt.% and 15 wt.% loading concentration, demanstrating the best MA performance of the sample with 10 wt.% grape-like Fe_3O_4-MWCNTs loading.

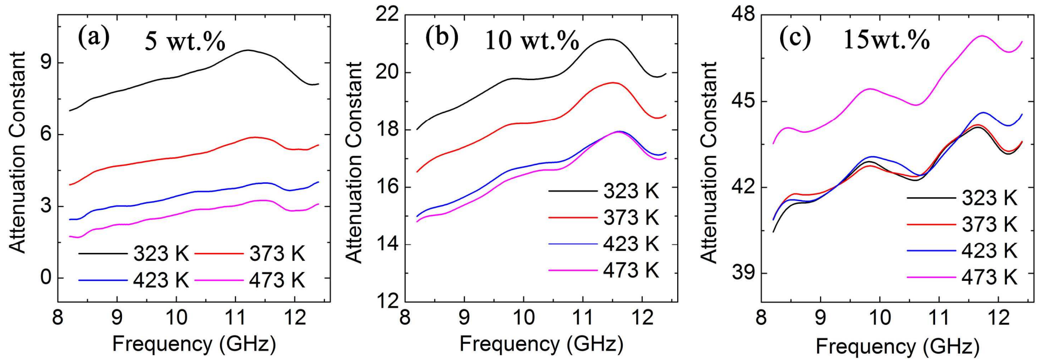

Figure S8. Attenuation constants of the composites with 5 wt.%, 10 wt.% and 15 wt.% loading concentration. Microwave attenuation in the interior absorber was determined by the attenuation constant α. As for 15 wt.% loading, the attenuation is strongest in the interior absorber, but the reflection from the surface of the absorber may be too high due to the enhanced conductivity. As results, the composites with 10 wt.% loading have the proper α due to a proper conductivity.