Supporting Information

Self-assembled ZnO/Co Hybrid Nanotubes Prepared by Electrospinning for Lightweight and High-Performance Electromagnetic Wave Absorption

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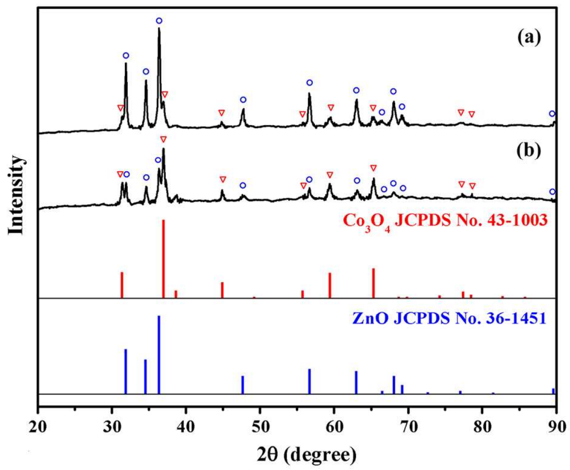

Figure S1. XRD patterns of ZC1 (a) and ZC2 (b) before hydrogen reduction.

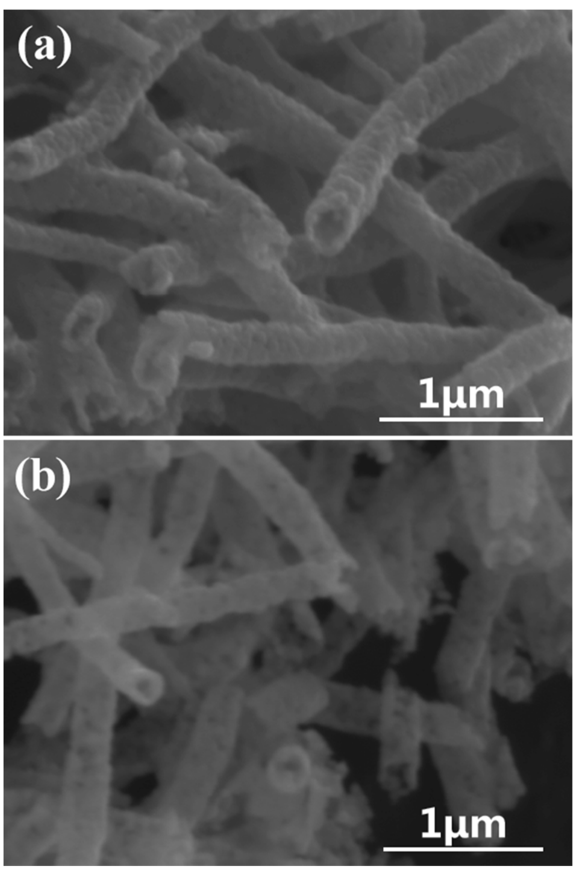

Figure S2. FE-SEM images of ZC1 (a) and ZC0 (b).

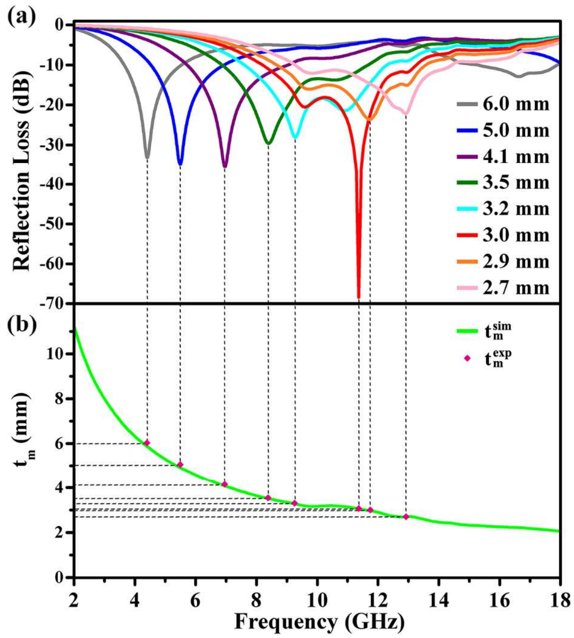

Figure S3. Frequency dependence of microwave reflection losses of ZC2 (a); the relationship between thickness and peak frequency derived from the quarter-wavelength cancellation model (b)

The quarter-wavelength cancellation model obeys the following equation:

$$t_m = \frac{nc}{4f_m\sqrt{|\mu_r||\varepsilon_r|}} \qquad (n = 1,3,5\ \ldots)$$

where t_m is the matching thickness and f_m is the matching frequency.

Figure S3a shows the simulation of the matching thickness (t_m^{sim}) and the experimental matching thickness (t_m^{exp}) versus matching frequency. The t_m^{sim} and the t_m^{exp} are in good agreement, which indicates the ZnO/Co nanotubes obey the quarter-wavelength cancellation model.

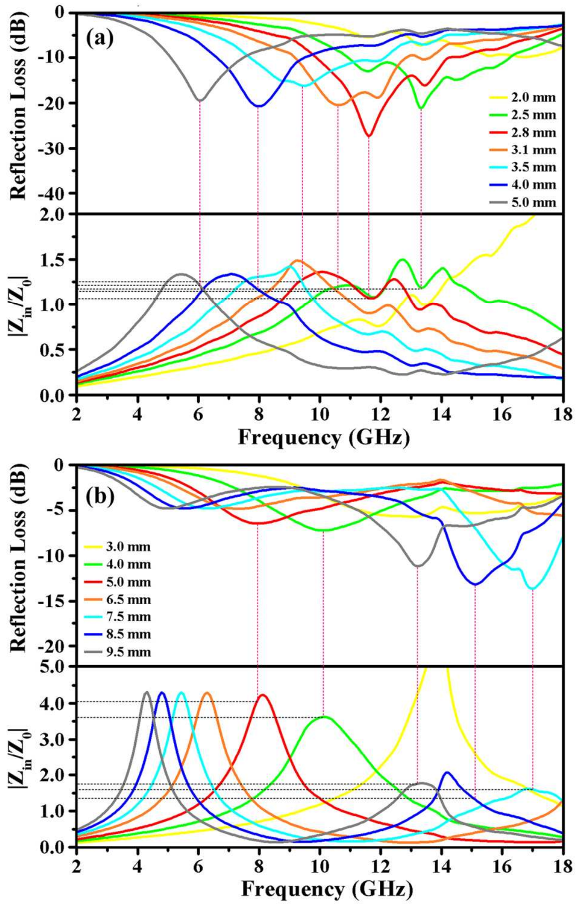

Figure S4. The Reflection loss at different thicknesses and the relative input impedance ($|Z_{in}/Z_0|$) against frequency of ZC1 (a) and pure ZnO (b).

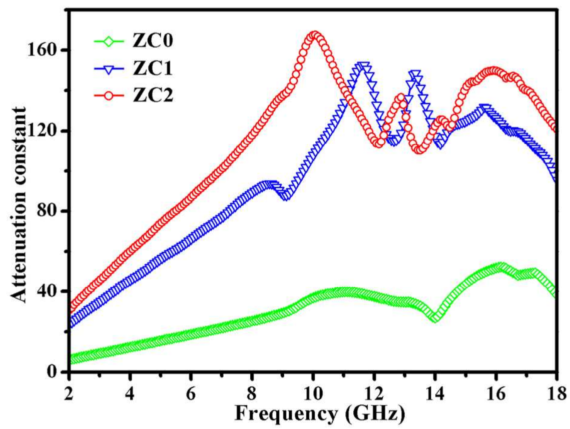

Figure S5. Attenuation constant (α) of ZC2, ZC1 and ZC0 as a function of frequency.

$$\alpha = \frac{\sqrt{2}\pi f}{c}\sqrt{(\mu''\varepsilon'' - \mu'\varepsilon') + \sqrt{(\mu''\varepsilon'' - \mu'\varepsilon')^2 + (\varepsilon'\mu'' + \varepsilon''\mu')^2}}$$

where f is the frequency, c is velocity of light.