Electronic Supplementary Information (ESI)

Cellulose composite aerogel for highly efficient electromagnetic interference shielding

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The pore size distribution and average pore diameter of cellulose composite aerogels

The pore size distribution of RC and its CNT composite aerogels was statistically analyzed based on the SEM images shown in Figs. 2 and 3. As shown in Fig. S1, it can be seen that the size of most pores of RC is <1μm, although a small portion of pores have a diameter in the 2-4 μm range. The incorporation of CNTs has little influence on the pore size distribution, only slightly increasing the diameter of pores except for RC0.45. The pore size distribution of RC0.45 is very similar to that of RC. As for average pore diameter shown in Fig. S1f, when the concentration of cellulose in the NaOH/urea aqueous solution is 2.5 wt%, the addition of CNTs can increase the average pore diameter in a subtle way compared to RC (~0.53 μm). This phenomenon is probably caused by the addition of surfactant, cetyltrimethyl ammonium bromide. However, the average pore diameter of RC0.45 is around 0.50 μm, basically being equal to that of RC. The higher concentration of cellulose, about 4.0 wt%, is favorable for the aggregation and phase assembly of CNT/cellulose-rich composite phase during freeze drying and the water phase, as a pore-foaming agent, is limited to smaller space, eventually giving rise to the lower average pore diameter of RC0.45.

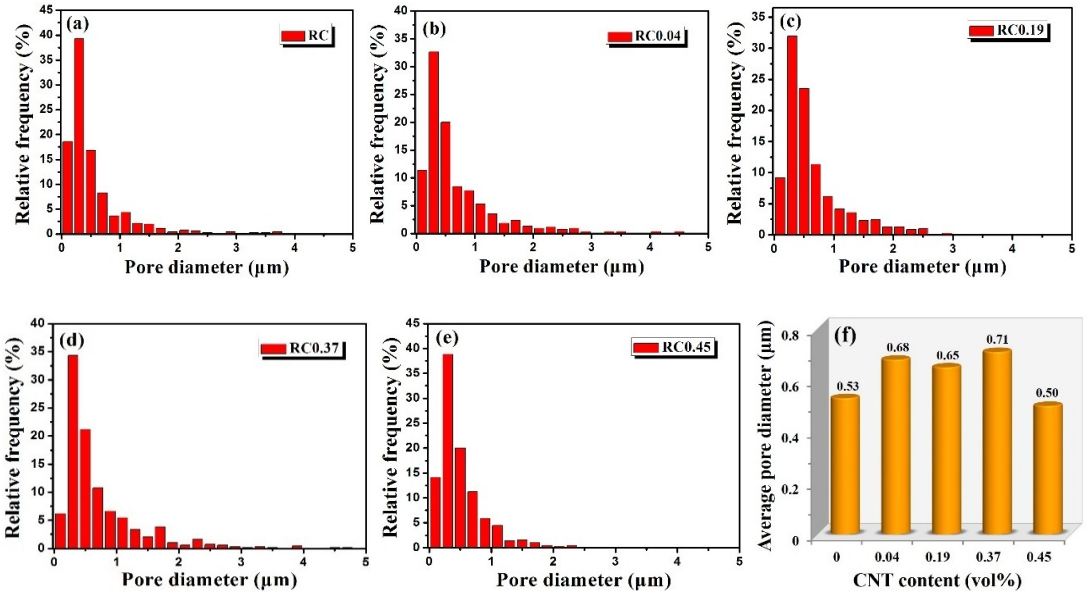

Fig. S1 Pore size distribution of RC (a), RC0.04 (b), RC0.19 (c), RC 0.37 (d), and RC0.45 (e). Average pore diameter of cellulose composite aerogel as a function of CNT content (f).

The power coefficients of the as-prepared cellulose composite aerogels

In order to further elaborate the EMI shielding mechanism of the as-prepared cellulose composite aerogels, the power coefficients of absorptivity (*A*), reflectivity (*R*), and transmissivity (*T*) are summarized in Fig. S2. To be specific, as for RC0.45, the average values of *A*, *R*, and *T* are 0.84, 0.15, and 0.01, while the corresponding values for RC0.37 are 0.81, 0.14 and 0.05, respectively. This results further confirm that the absorption is the dominant shielding mechanism for such green conductive composite aerogels.

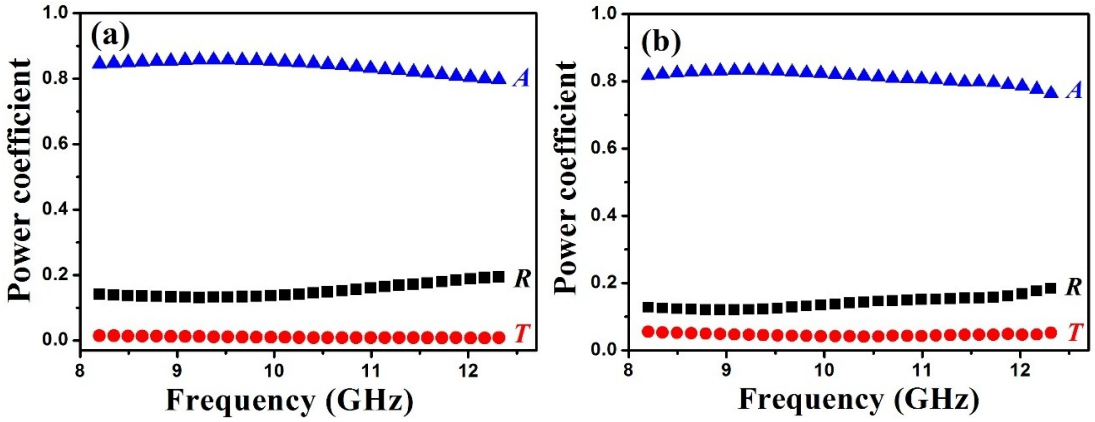

Fig. S2 Absorptivity (*A*), reflectivity (*R*), and transmissivity (*T*) of RC0.45 (a) and RC0.37 (b) in the microwave frequency range of 8.2-12.4 GHz.