Supporting information

New promising hybrid materials for electromagnetic interference shielding with improved stability and mechanical properties

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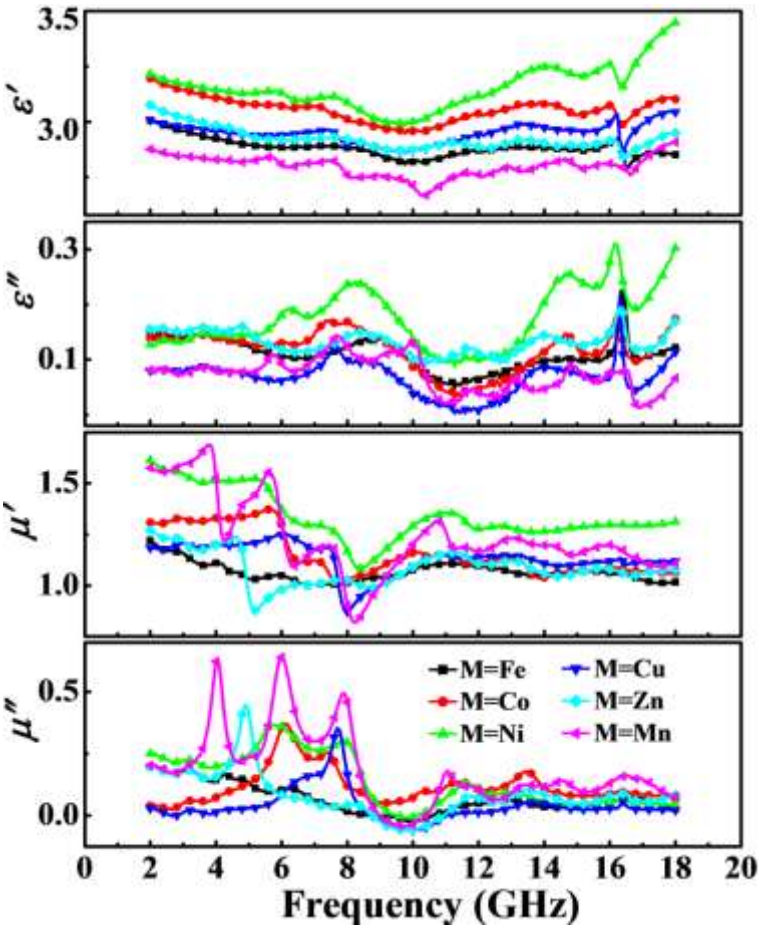

Fig. S1. Real and imaginary parts of the complex permittivity and complex permeability spectra of $M_{0.2}Fe_{2.8}O_4$ nanoparticles.

The electromagnetic parameters expressed as complex permittivity ($\varepsilon_r=\varepsilon'-j\varepsilon''$) and complex permeability ($\mu_r=\mu'-j\mu''$) of the $M_{0.2}Fe_{2.8}O_4$ nanoparticles in the 2–18 GHz frequency range were recorded on the network analyzer, for the studies of the electromagnetic and microwave absorption properties. The real and imaginary parts represented the storage and loss of electromagnetic wave energy in absorbents through various magnetic and dielectric phenomena. They are shown in Fig. S1, respectively. Both ε' and ε'' of Fe_3O_4 were almost constant with frequency and low values, while μ' and μ'' values of Fe_3O_4 were small and decreased smoothly with frequency, and appears no resonance peaks, indicating a poor dielectric and magnetic loss. However, it was observed that most of the $M_{0.2}Fe_{2.8}O_4$ nanoparticles presented higher values of the electromagnetic patterns. It indicated that the dielectric and magnetic losses were enhanced and resulted in an improvement of the microwave absorption properties, since the microwave absorption properties are commonly determined by the dielectric and magnetic losses.

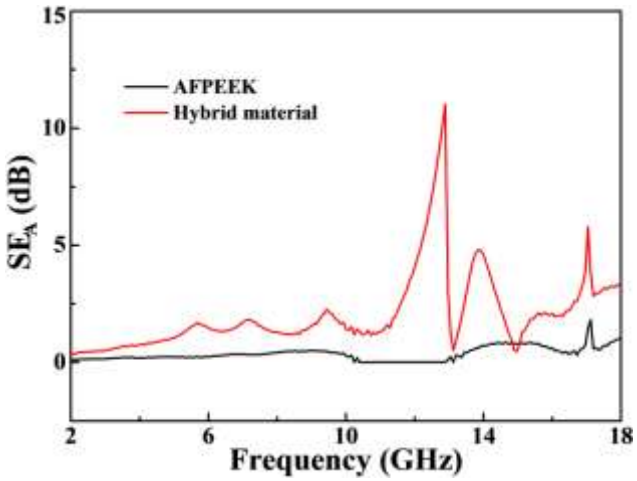

Fig. S2. The variation of SE_A with frequency for AFPEEK and the $Co_{0.2}Fe_{2.8}O_4$@SiO_2-PEEK hybrid material.

It was found with the increase in frequency, the SE_A values of the hybrid material increased, and achieved the maximum value around 12-14 GHz. While the AFPEEK displayed extremely poor absorption. This indicated the hybrid material could be utilized as an electromagnetic interference shielding material for its microwave-absorbing behavior.