Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Supporting Information

High electromagnetic wave absorption and flame retardancy performance from NF@HCS/NF filled epoxy-based electronic packaging material

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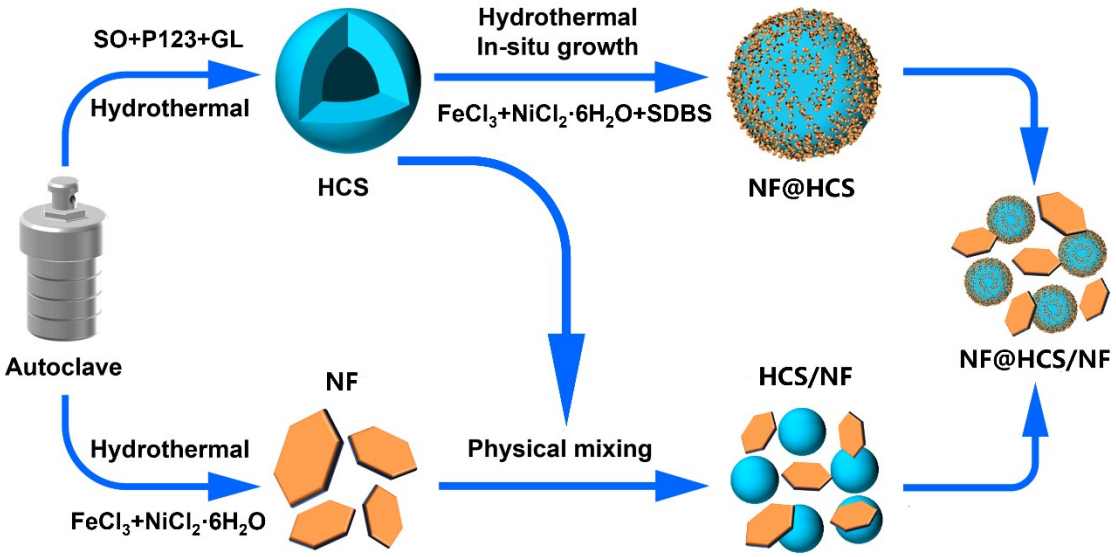

Fig. S1 The illustration of synthesis routes and relationships of HCS, NF, NF@HCS, HCS/NF, and NF@HCS/NF.

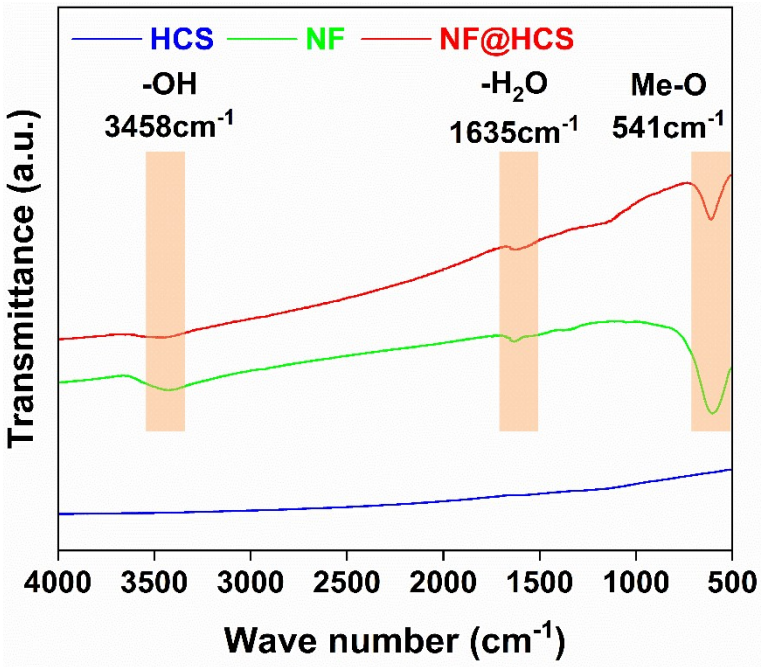

Fig. S2 The FT-IR spectroscopy of HCS, NF and NF@HCS. The Me-O vibration peaks around 541 cm^{-1} show the existence of NF and successful combination of NF and HCS.

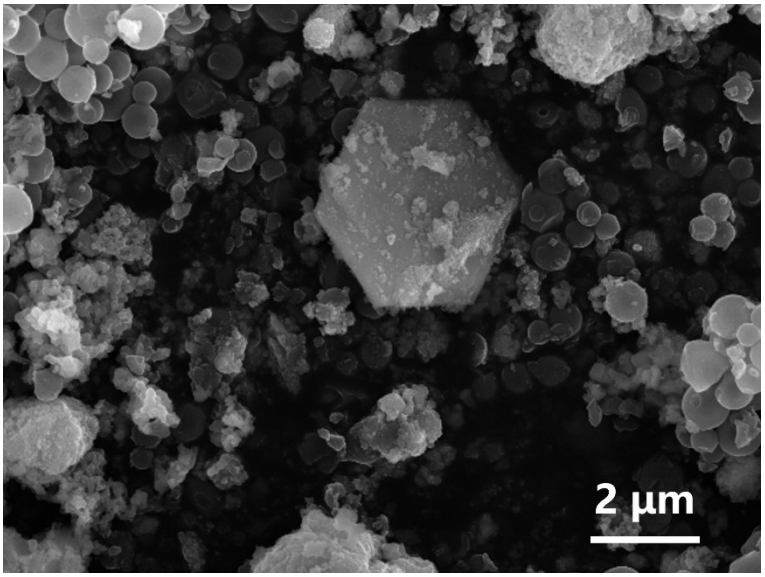

Fig. S3 The SEM image of NF@HCS/NF, showing the presence of HCS, microscale NF sheets, and nanoscale NF particles on HCS.

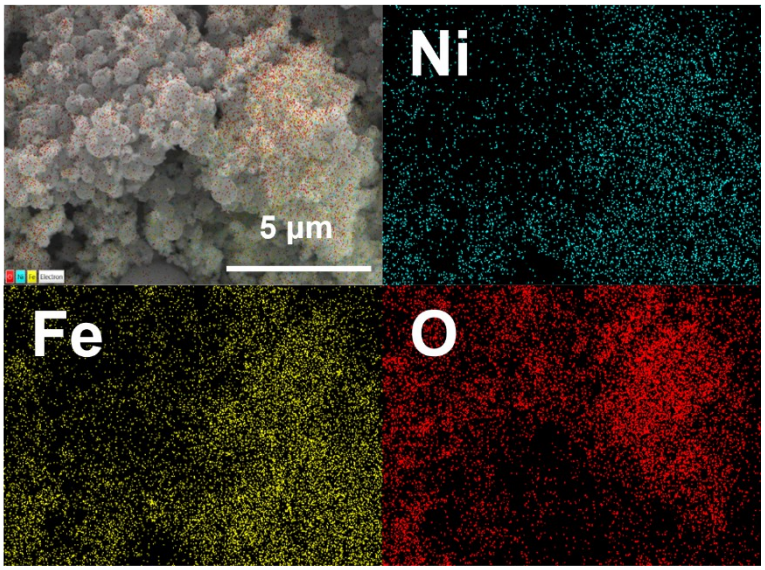

Fig. S4 The EDX mapping graphs of elemental distributions in NF@HCS powders, indicating the presence of Fe, Ni, and O elements.

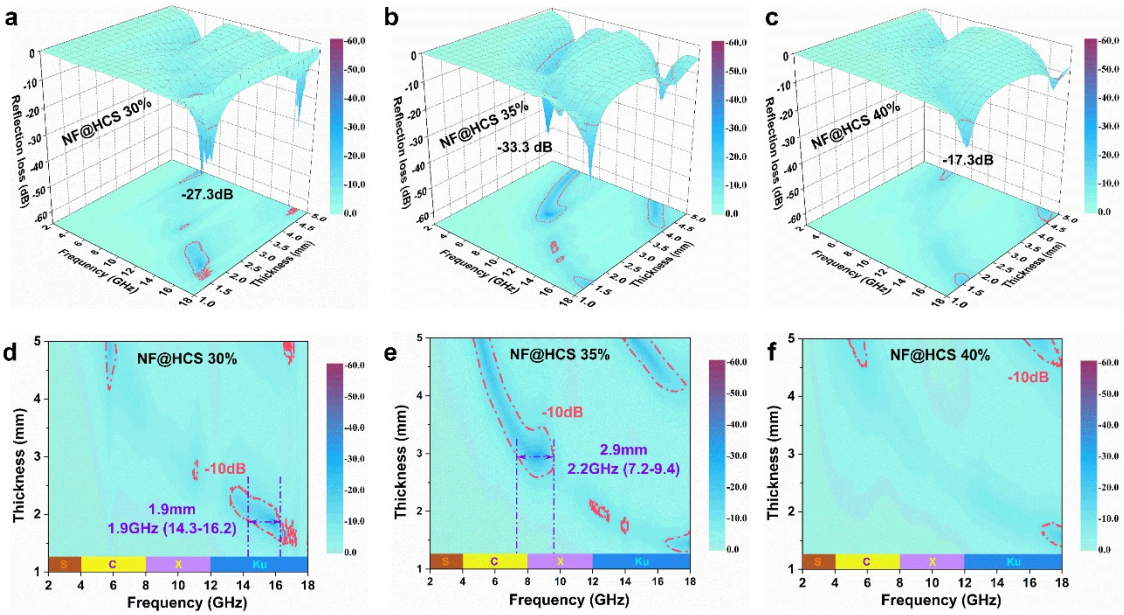

Fig. S5 The 3D RL diagrams and corresponding 2D RL mapping graphs of NF@HCS at different filling contents.

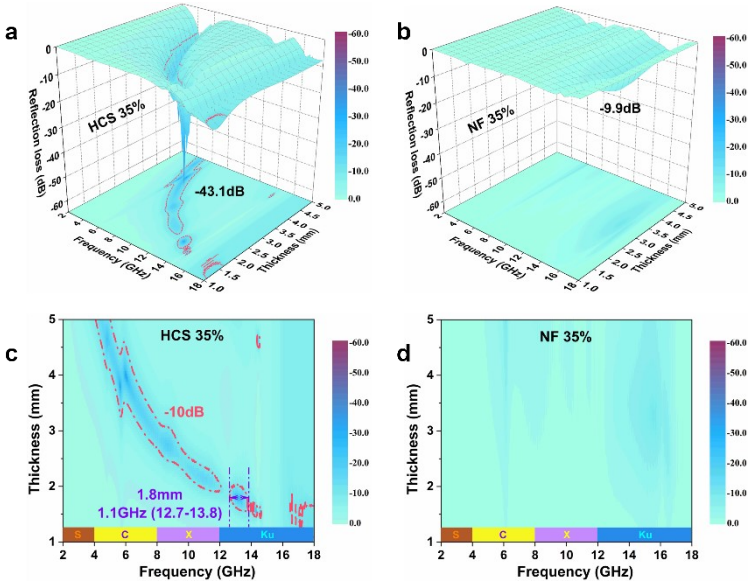

Fig. S6 The 3D RL diagrams and corresponding 2D RL mapping graphs of pure HCS and NF at filling contents of 35 wt%.

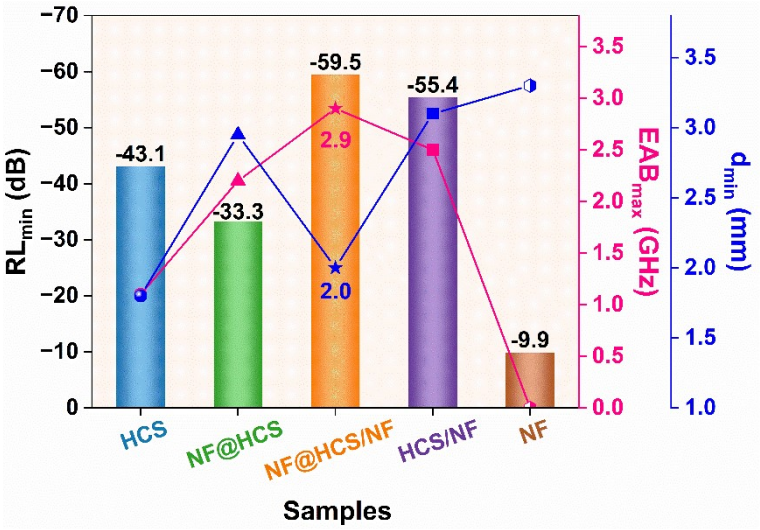

Fig. S7 The EMW absorption performance (RL_{min}, EAB_{max}, and d_{min} values) summary graph of HCS, NF@HCS, NF@HCS/NF, HCS/NF, and NF.

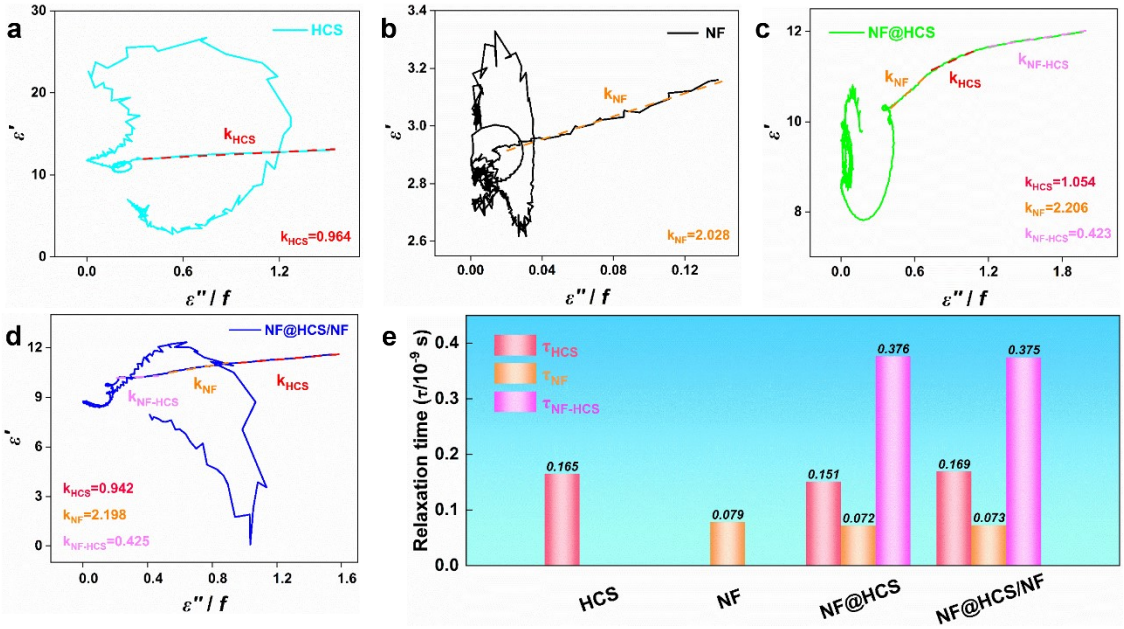

Fig. S8 (a-d) The relationship between ε' and ε''/f and (e) corresponding dielectric relaxation time of HCS, NF, NF@HCS and NF@HCS/NF.

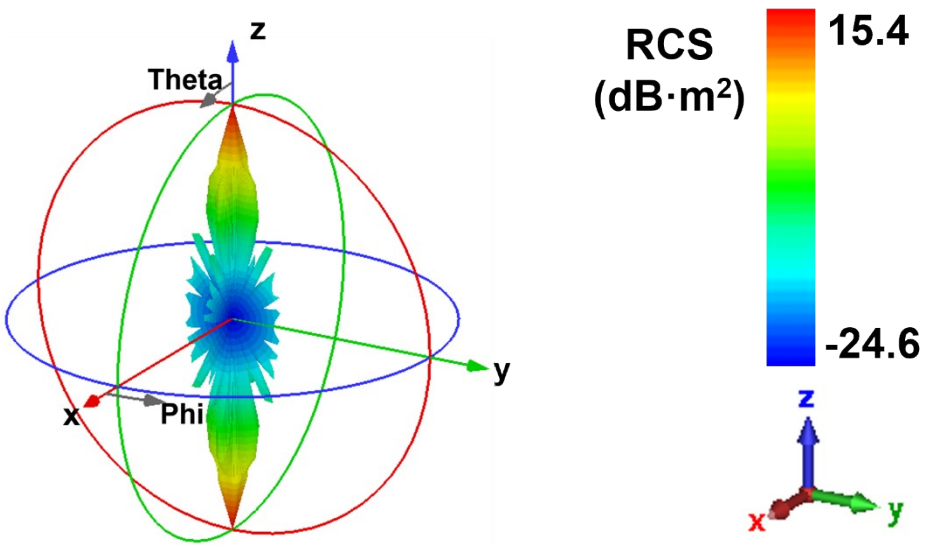

Fig. S9 CST 3D simulation plot of the perfect electric conductor (PEC) used here.

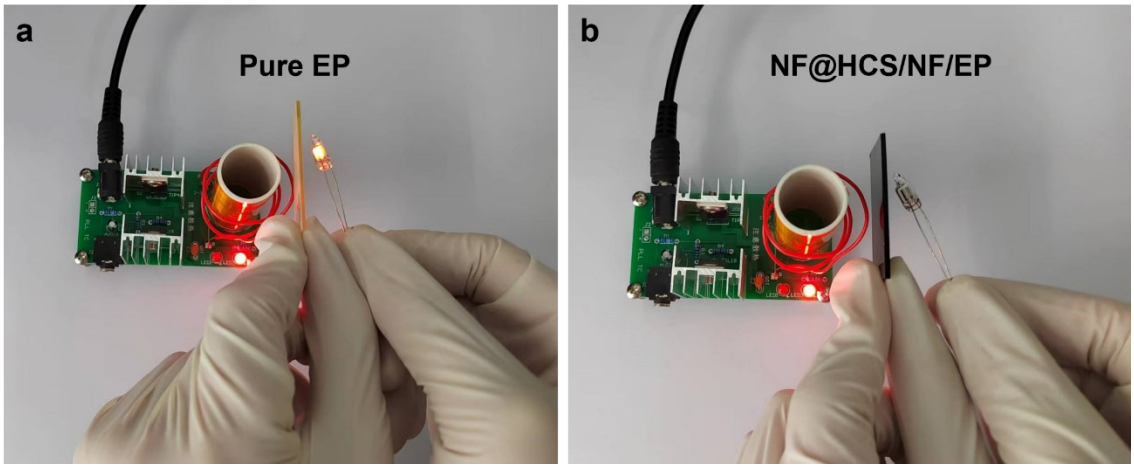

Fig. S10 The demonstration experiments via a Tesla coil showing the EMW absorption performance of (a) pure EP compared with (b) the as-prepared NF@HCS/NF/EP composite.

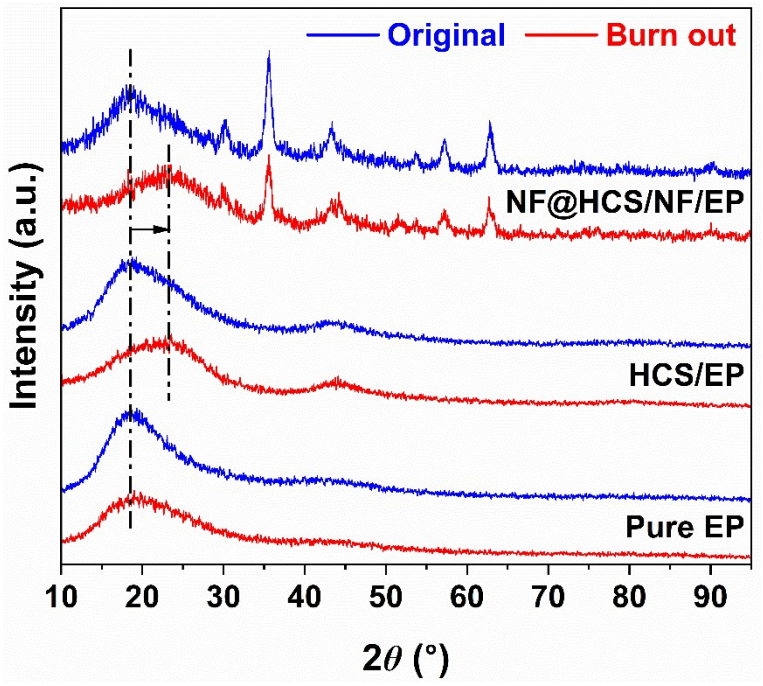

Fig. S11 The XRD patterns of pure EP, HCS/EP and NF@HCS/NF/EP before and after ignition. The red lines of burn-out samples show the phase and chemical stabilities of NF and HCS in the NF@HCS/NF/EP composites.

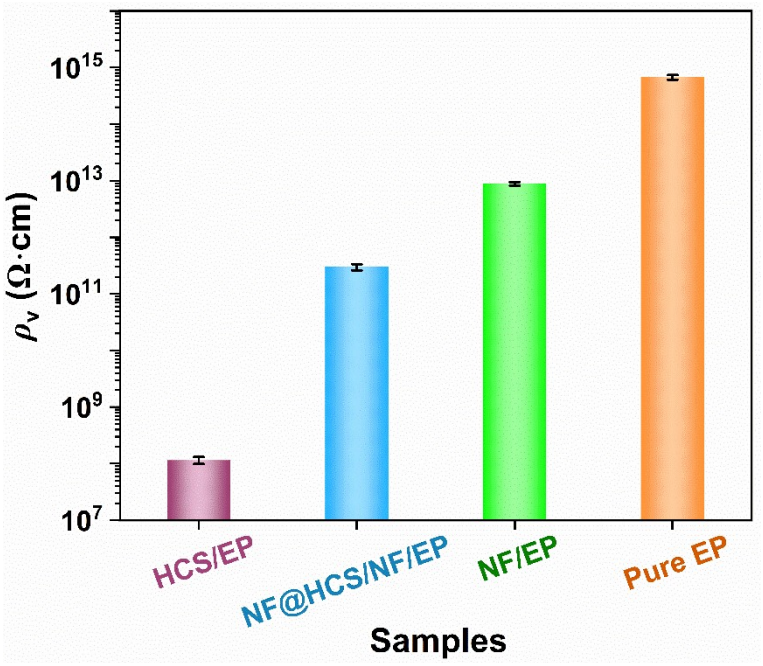

Fig. S12 The volumetric resistivity (ρ_v) values of as-prepared composites.

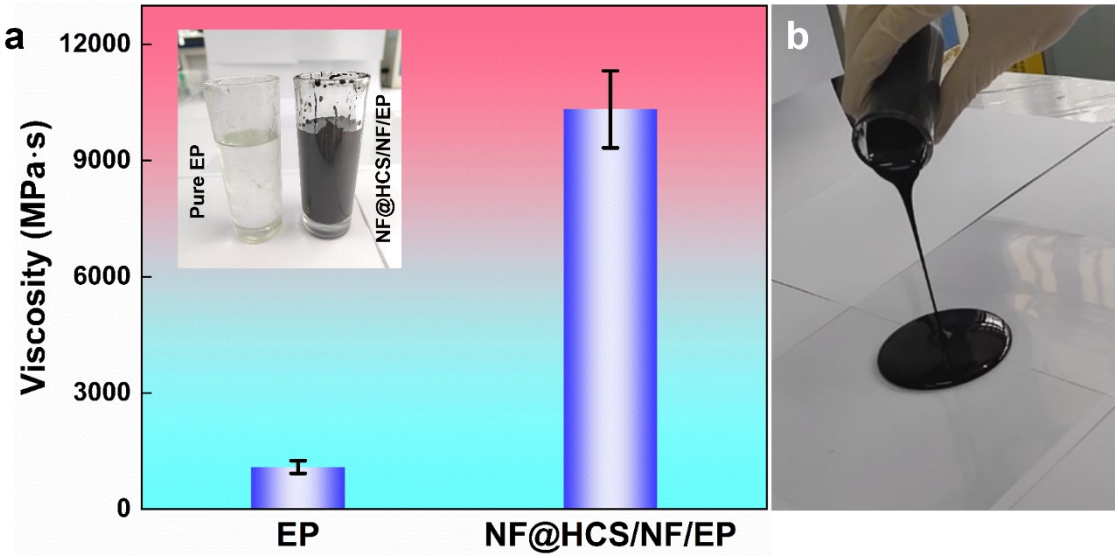

Fig. S13 (a) The viscosity of pure EP and NF@HCS/NF/EP systems, and the mass ratio of fillers is also 35% as above. Though the viscosity of NF@HCS/NF/EP (10322 MPa·s) is higher than pure EP (1088 MPa·s), the viscosity below 20000 MPa·s is still suitable for potting application. (b) The demonstration experiment showing good leveling performance of NF@HCS/NF/EP system.