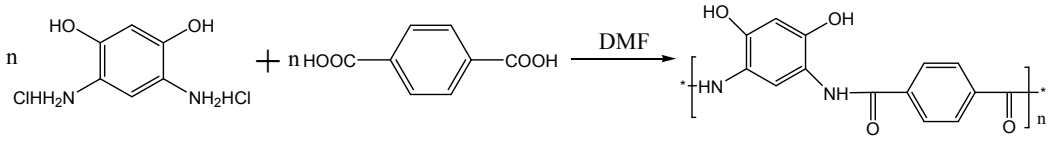

Scheme S1 Synthesis of PHA

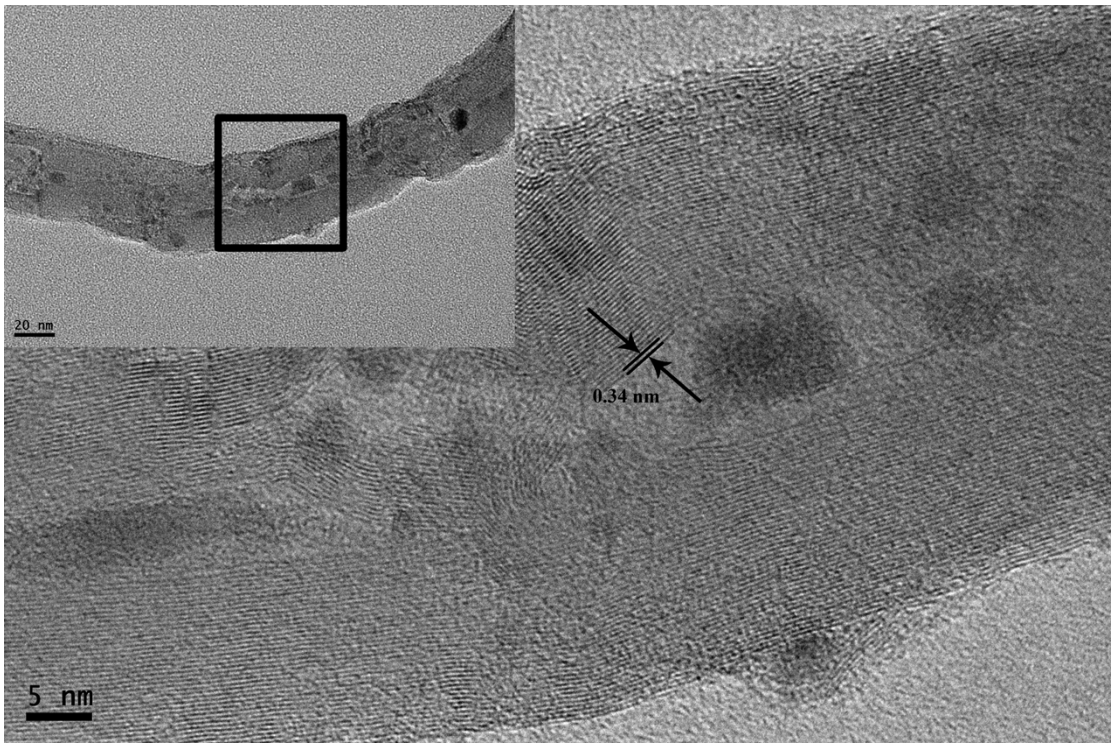

Fig. S1 HRTEM image of the filled MWNTs taken from the area marked with black frame in the insert

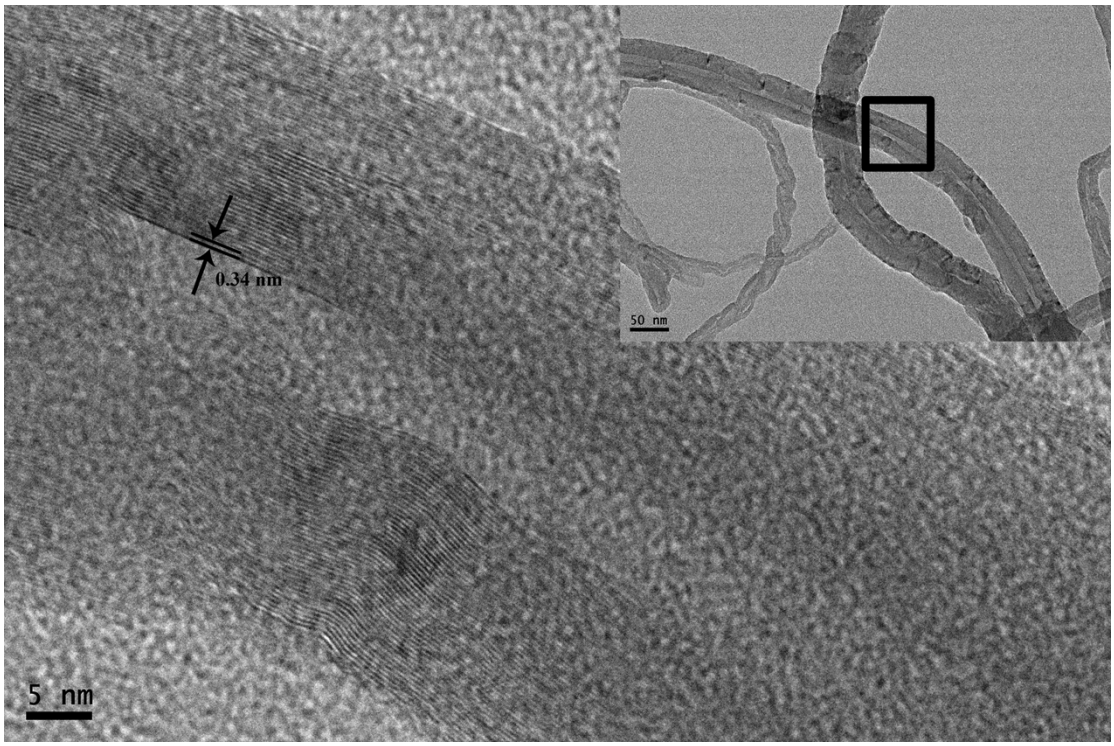

Fig. S2 HRTEM image of the purified MWNTs taken from the area marked with black frame in the insert

HRTEM images of purified MWNTs before (Fig. S1) and after (Fig. S2) filling the γ-Fe_2O_3 nanoparticles. The spacing of lattice fringes of individual crystallites relates to the d-spacing of carbon nanotube wall is 0.34 nm. And the dark spots in Fig. S2 shows the γ-Fe_2O_3 nanoparticles are encapsulated by the MWNTs.

Poly (*o*-hydroxyamide) (PHA) was prepared by a typical polycondensation of 4,6-diaminoresorcinol dihydrochloride(DAR·2HCl) with terephthaloyl chloride (TPC) (Scheme S1). The molecular weights of PHA were 1.122x10^5 (M_w) and 1.615x10^5 (M_n) according to the GPC result.

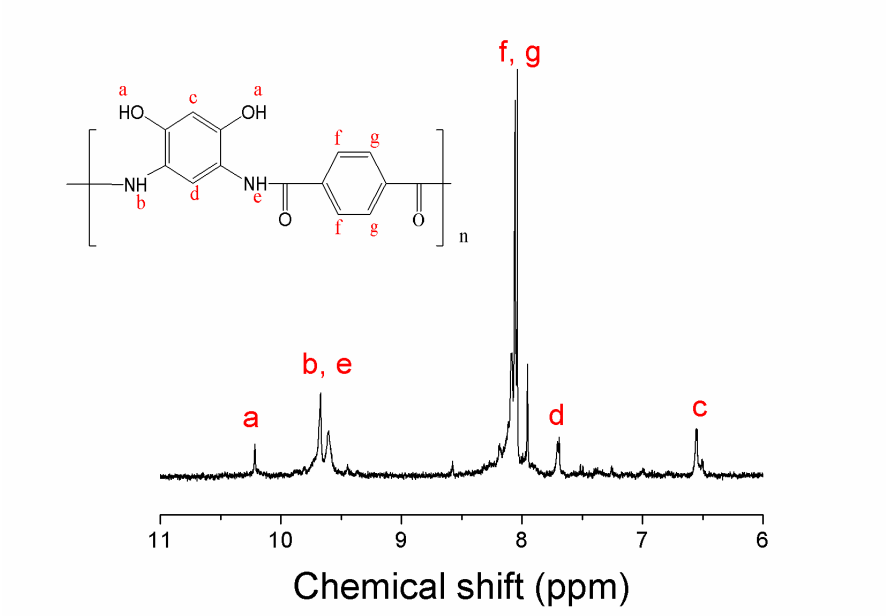

Fig. S3 ^{1}H-NMR spectrum of PHA

Fig. S3 shows the ^{1}H-NMR spectrum of PHA, in which all the protons in the polymer backbones could be well assigned to the expected chemical structure. The characteristic signals of amide and hydroxyl groups at 9.60, 9.67 and 10.22 ppm were observed, respectively.

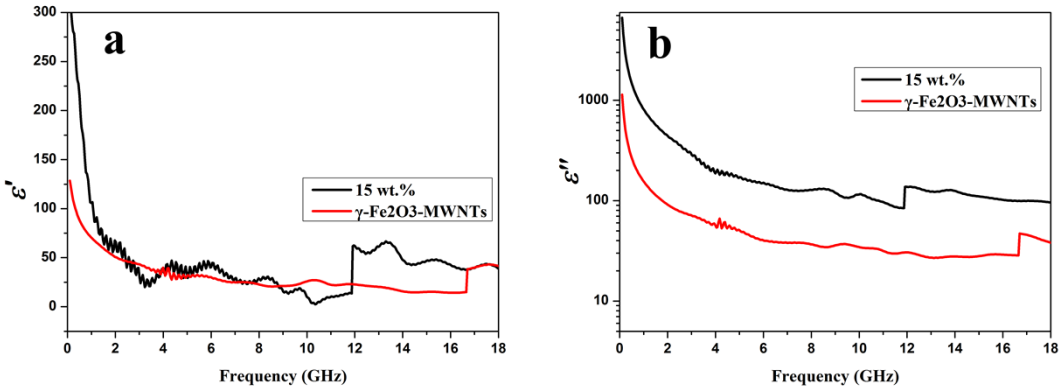

Fig. S4 ε' and ε" of sample containing 15 wt.% of γ-Fe_2O_3-MWNTs and pure γ-Fe_2O_3-MWNTs.

The real (Fig. S4a) and imaginary (Fig. S4b) parts of permittivity of pureγ-Fe_2O_3-MWNTs and the 15 wt.% composite sample. The enhanced *ε'* and *ε"* of the 15 wt.% could be attributed to the interfacial polarization or Maxwell-Wagner-Sillars theories.

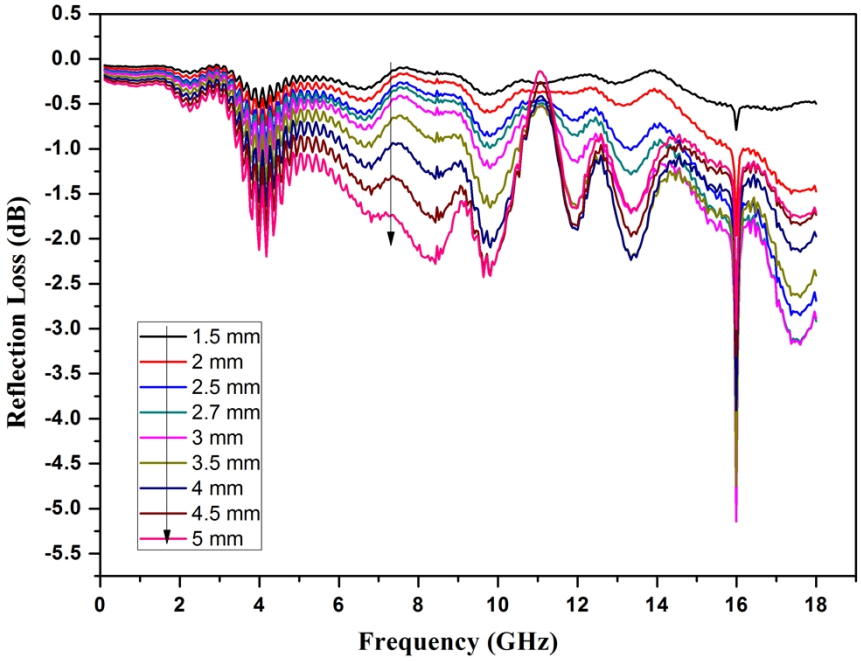

Fig. S5 Microwave reflection losses of PBO paraffin wax composites versus frequency.

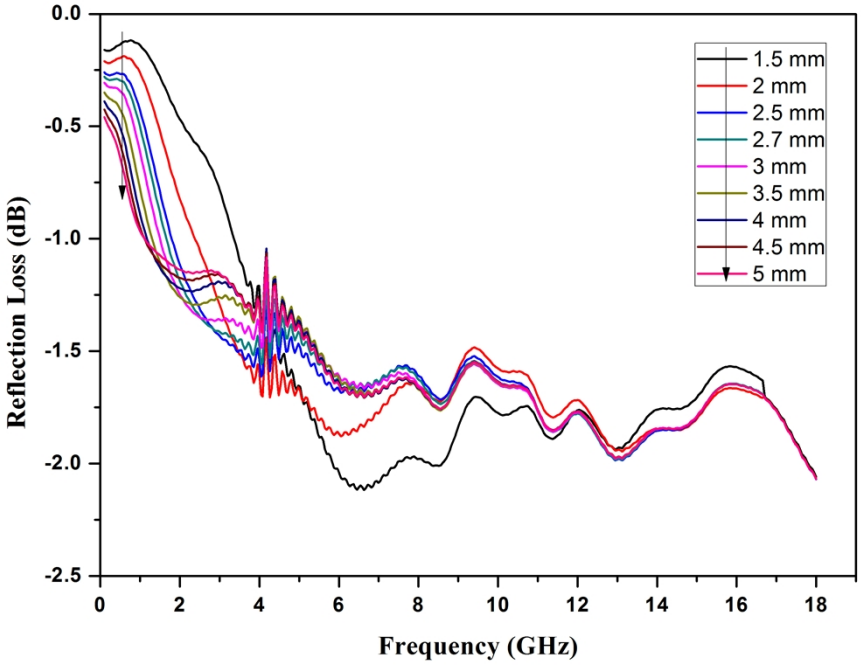

Fig. S6 Microwave reflection losses of γ-Fe_2O_3-MWNTs paraffin wax composites versus frequency

The microwave reflection losses of PBO (Fig. S5) and γ-Fe_2O_3-MWNTs (Fig. S6) paraffin wax composites versus frequency were shown above. When the percentage of γ-Fe_2O_3-MWNTs is below 10 wt.% and above 12 wt.%, neither the best impedance matching situation nor the optimal synergistic effect exists, and the microwave absorption properties of the composites were dominated by the PBO matrix and the functionalized MWNTs, respectively.