Electronic Supplementary Information (ESI)

M-H loop of PIC/Co-1000 demonstrates that PIC/Co-1000 (Ms=9 emu g^{-1}) maintains the super paramagnetic property of the Co nanoparticles. It is believable the magnetic property may contribute to the complex permeability of the absorber and a better matching condition between the complex permittivity and permeability.

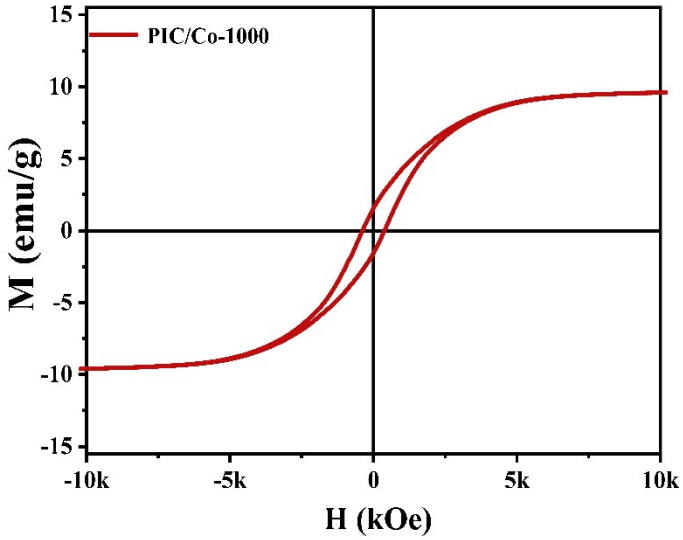

Fig. S1. M-H loop for the synthesized polyimide based porous carbon and Co particle composite absorber (PIC/Co-1000).

Under an air atmosphere, the carbon and Co metal particles in PIC/Co-800 and PIC/Co-1000 translates into CO_2 and CoO respectively. As the residual weight of PIC/Co-800 and PIC/Co-1000 are 11.70 % and 9.26 %, the Co metal particles content in PIC/Co-800 and PIC/Co-1000 are 9.20 % and 7.28 % according to the weight ratio equation, respectively.

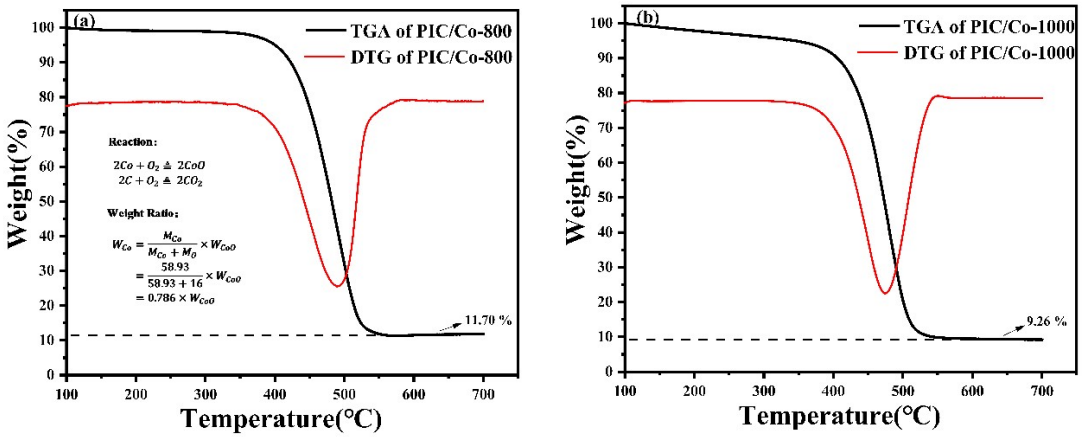

Fig. S2. (a)The TGA and DTG curves for PIC/Co-800 measured in air atmosphere; (b)The TGA and DTG curves for PIC/Co-1000 measured in air atmosphere.

The EWW attenuation performance of PIC-800 and PIC-1000 was shown in Fig. S3 (a), (b). As PIC-800 and PIC-1000 only has dielectric loss component, it fails to get a fine EM matching condition and obtain a strong EMW attenuation ability. At a filler loading of 25 wt%, the minimum RLs of PIC-800 are smaller than -4 dB and he minimum RLs of PIC-1000 are -12.5 dB. The EWW attenuation performance of PIC/Co-800 was shown in Fig. S3 (c). At a filler loading of 25 wt%, PIC/Co-800 shows a better EMW absorption performance compared with PIC-800. At 5.5 mm, the minimum RL can reach -31 dB. Comparing with the EMW absorption performance of PIC/Co-800 and PIC/Co-1000, the EMW absorption ability of PIC is not satisfying. Therefore, magnetic component in PIC/Co-800 and PIC/Co-1000 plays an important role in the improvement of EMW absorption performance.

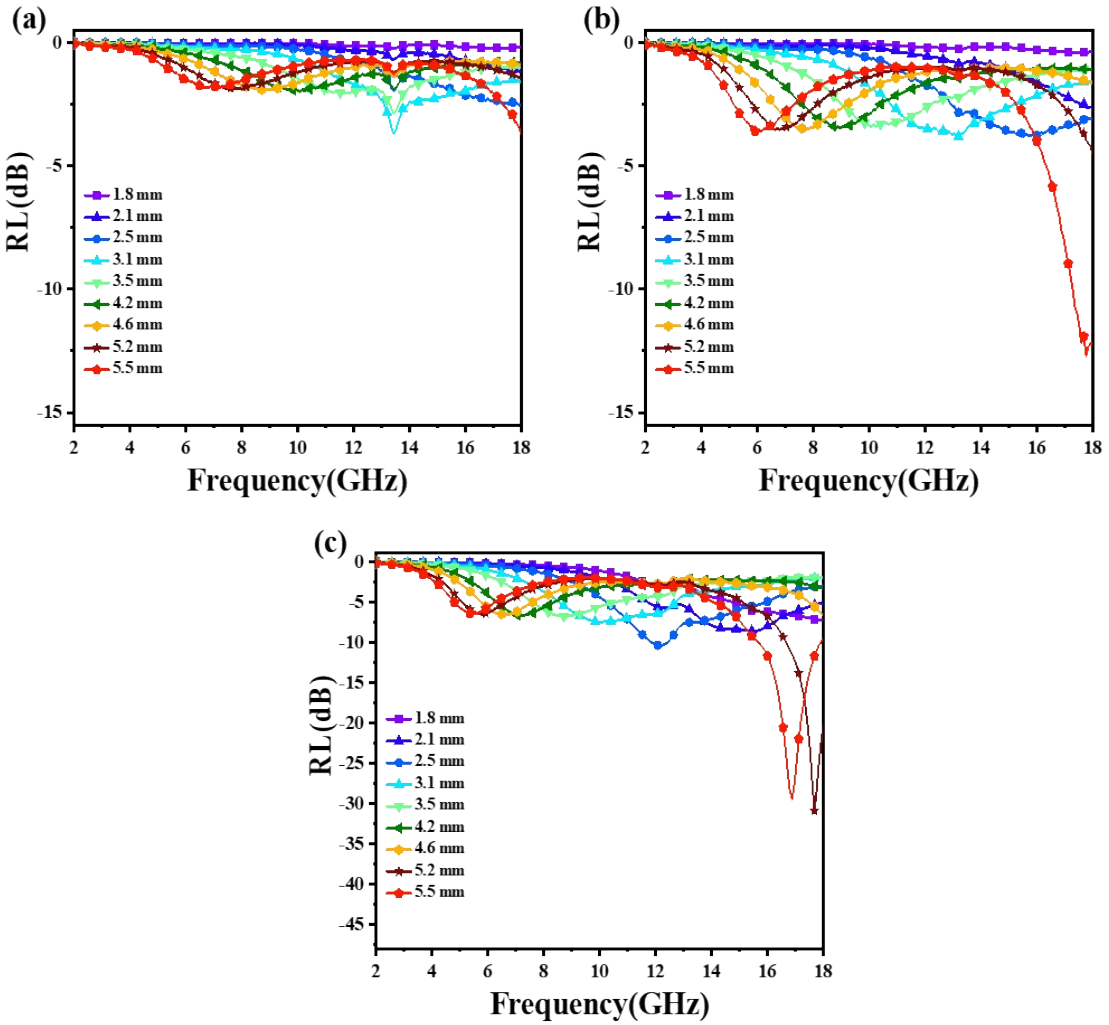

Fig. S3. Reflection loss (RL)-frequency curves of (a) PIC-800, (b) PIC-1000, and (c) PIC/Co-800 in the range of 2–18 GHz with absorber thicknesses from 1.8 to 5.5 mm and an absorber content of 25%.