Electronic Supplementary Material (ESI) for RSC Advances.

The imidization of PAA was presented in the FTIR spectra in Fig.S1, the PAA materials were confirmed by the characteristic peaks at 1720, 1660, and 1560 cm^{-1} for the C=O (acid), C=O (amide), and C-N (amide) stretching vibration, respectively. PAA was then transformed to PI via thermal imidization, as shown by the characteristic absorption double peaks at 1781 and 1720 cm^{-1} for both the symmetric and asymmetric C=O stretching vibrations of the imide group and the peak shift at the 1376 cm^{-1} and 725 cm^{-1} C-N-C stretching vibration for PI

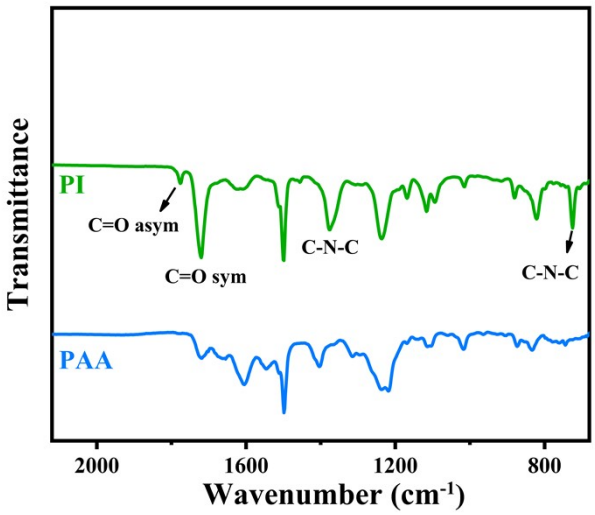

Fig.S1. FTIR spectra of thermal imidization of PAA

The 5% weight-loss temperature weight loss temperature of PI was observed as 552 °C And the content of residual carbon of PI is 59.2 %

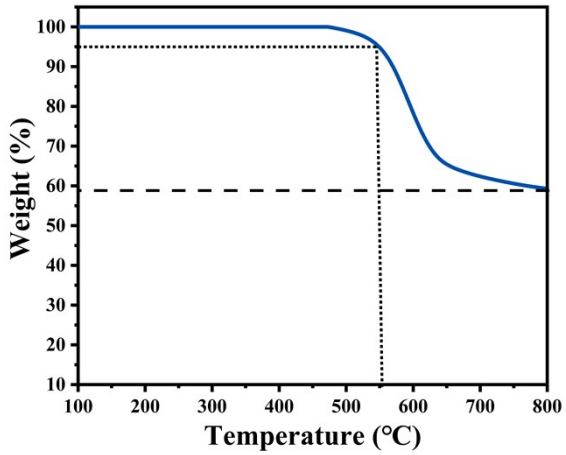

Fig.S2. TGA curves of PI

As PIC 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 RL of PIC is -3.68 dB

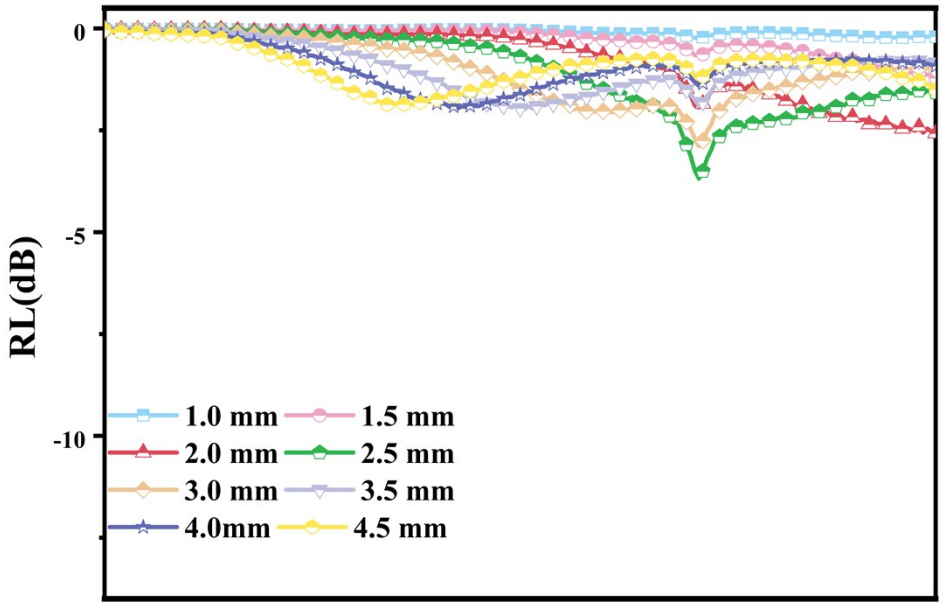

Fig.S3. Reflection loss (RL)-frequency curves of PIC in the range of 2–18 GHz with absorber thicknesses from 1.0 to 4.5 mm and an absorber content of 25%.

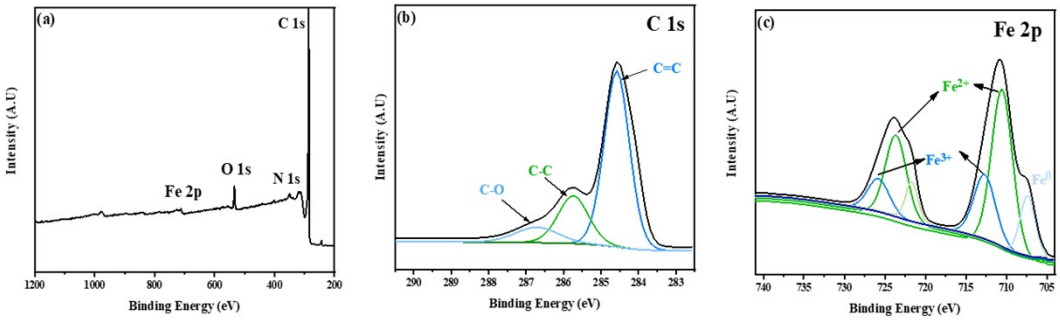

Fig.S4. (a) XPS survey spectrum of PIC/Fe_3C-2; (b) C 1s spectrum; (c) Fe 2p spectrum

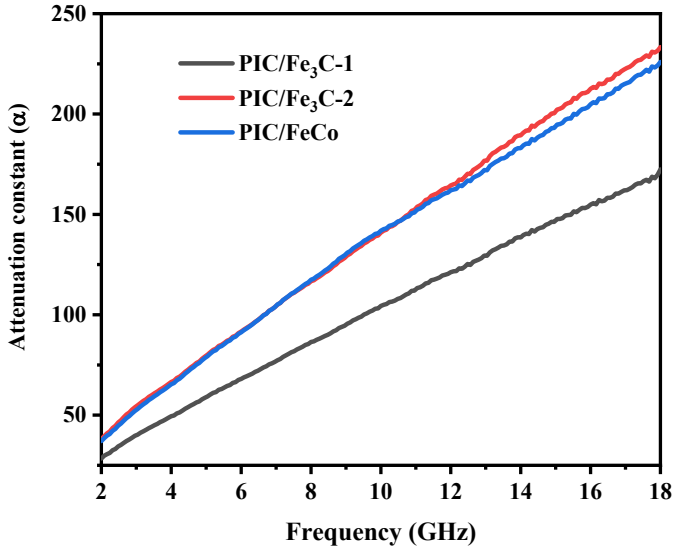

Fig.S5. attenuation constant of PIC/Fe_3C-1, PIC/Fe_3C-2 and PIC/FeCo