Supporting Information

Flexible composite film of aligned polyaniline grown on the surface of magnetic barium titanate/polyvinylidene fluoride for exceptional microwave absorption performance

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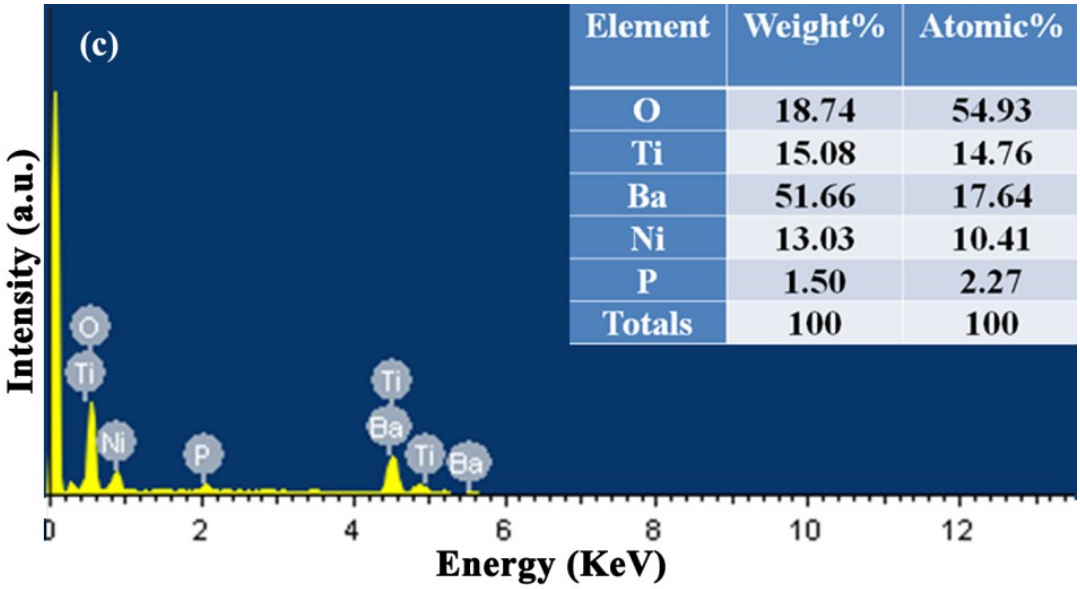

Element	Weight%	Atomic%
O	18.74	54.93
Ti	15.08	14.76
Ba	51.66	17.64
Ni	13.03	10.41
P	1.50	2.27
Totals	100	100

Fig. S1 EDS of $BaTiO_3$@Ni-P.

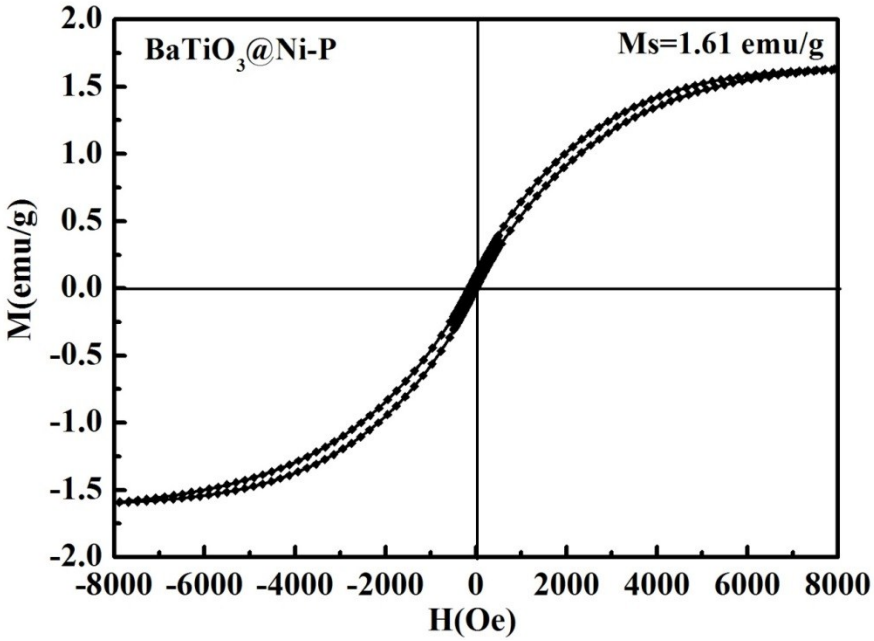

Fig. S2 Hysteresis loop of $BaTiO_3$@Ni-P.

The XRD patterns are shown in Fig. S3a. For the pattern of pure PVDF, it is observed that two broad diffraction peaks presented with 2 Theta degrees of 18.4° and 20.0°, which refer to the plane of (020) and (200) for α–phase and β–phase PVDF, respectively.[1] For the pattern of $BaTiO_3$@Ni-P/PVDF/PANI, sharper diffraction peaks at 2θ=18.6° and 20.2° can be observed compared to $BaTiO_3$@Ni-P/PVDF, which corresponding to the periodicity both perpendicular and parallel to the PANI polymer chain.[2, 3]

Functional groups of PANI is also detected by FT-IR measurement, as shown in Figure S3b, the characteristic peaks at 1566 cm^{-1} and 1489 cm^{-1} are attributed to the C = C stretching vibration of the quiniod (Q) ring and the benzenoid (N) ring, respectively. The peak at 1298 cm^{-1} is attributed to and C-N stretching vibration in PANI. The peak at 1243 cm^{-1} is assigned to the stretching vibration of the $CN^{\cdot+}$ in the polaron structure of PANI. The characteristic peak at 1122 cm^{-1} is due to the stretching of C = N(N = Q = N).[4]

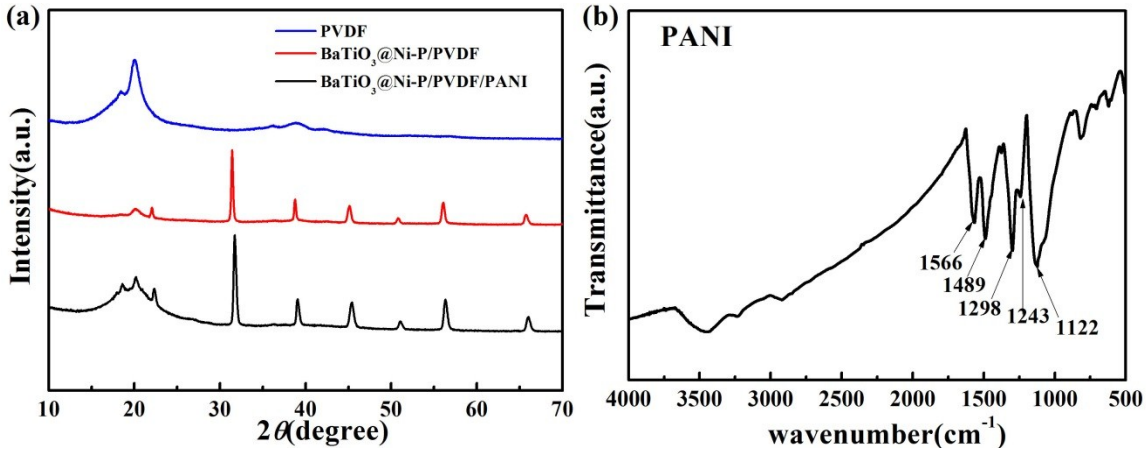

Fig. S3 (a) XRD patterns of samples; (b) FT-IR spectra of PANI.

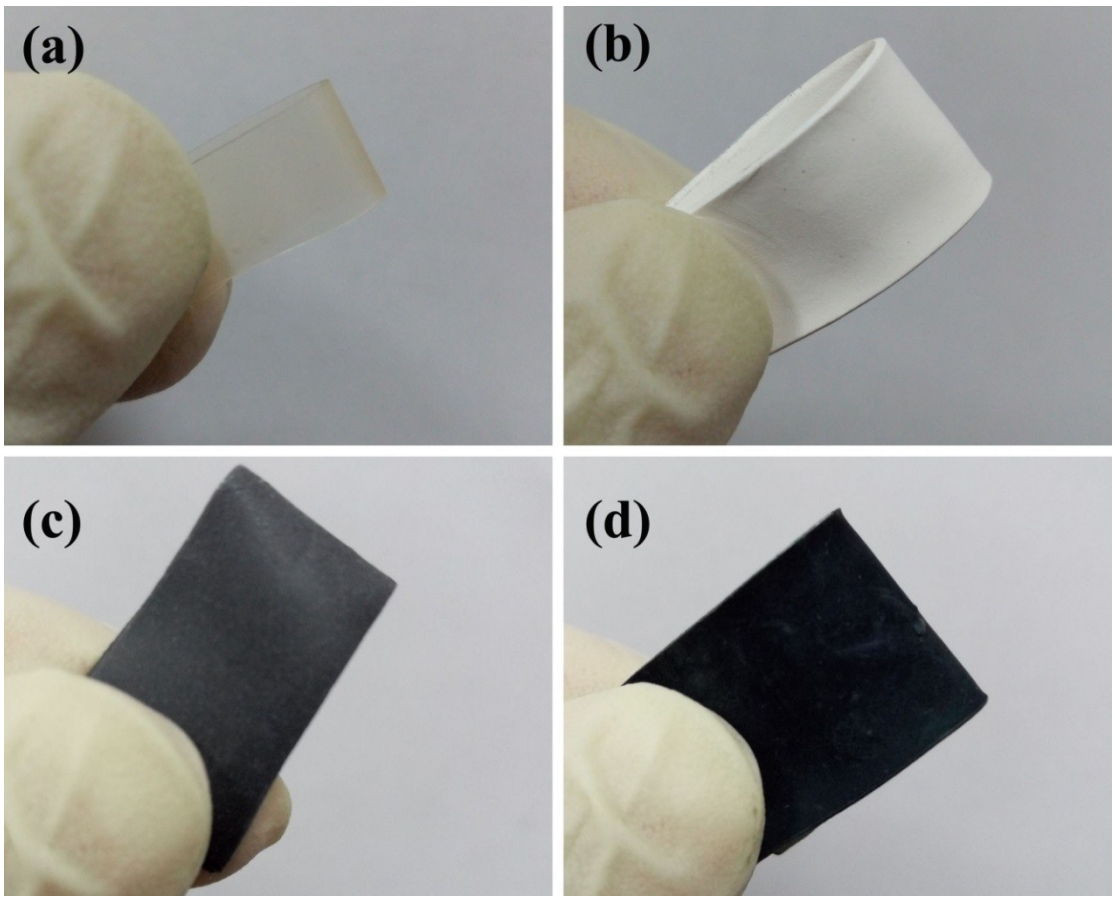

Fig. S4 Photographs of samples: (a) PVDF, (b) $BaTiO_3$/PVDF, (c) $BaTiO_3$@Ni-P/PVDF, (d) $BaTiO_3$@Ni-P/PVDF/PANI.

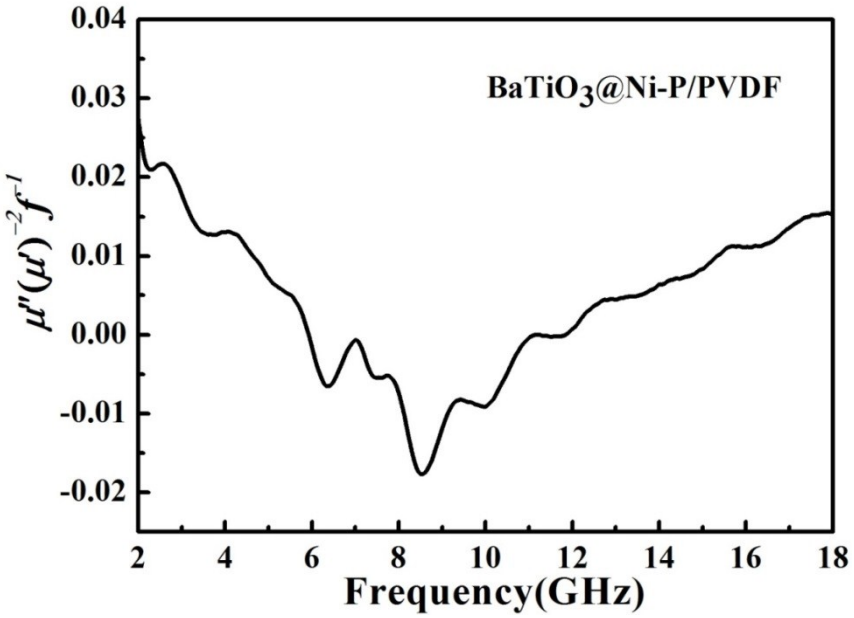

Fig. S5 The frequency dependence of $\mu''(\mu')^{-2}f^{1}$ for $BaTiO_3$@Ni-P/PVDF composite.

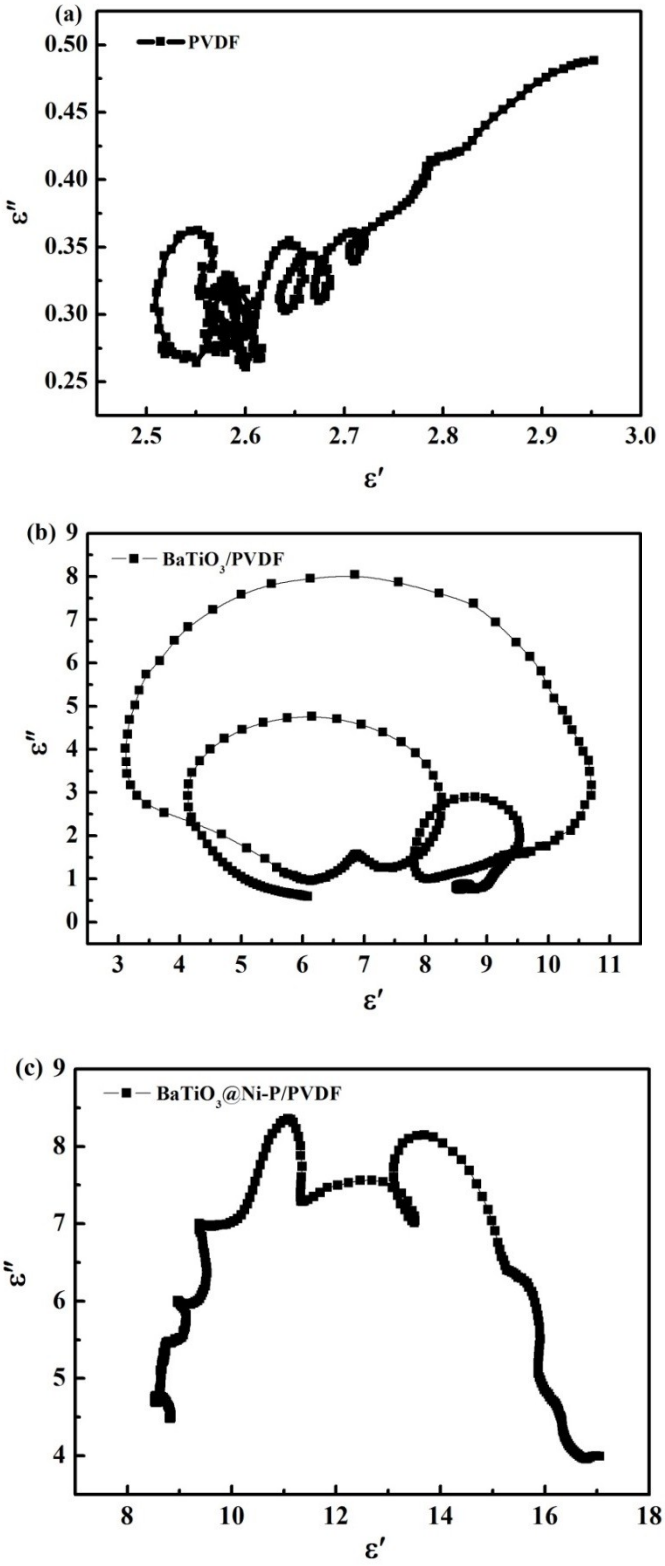

Fig. S6 ε'–ε'' curves of (a) PVDF, (b) $BaTiO_3$/PVDF and (c) $BaTiO_3$@Ni-P/PVDF.

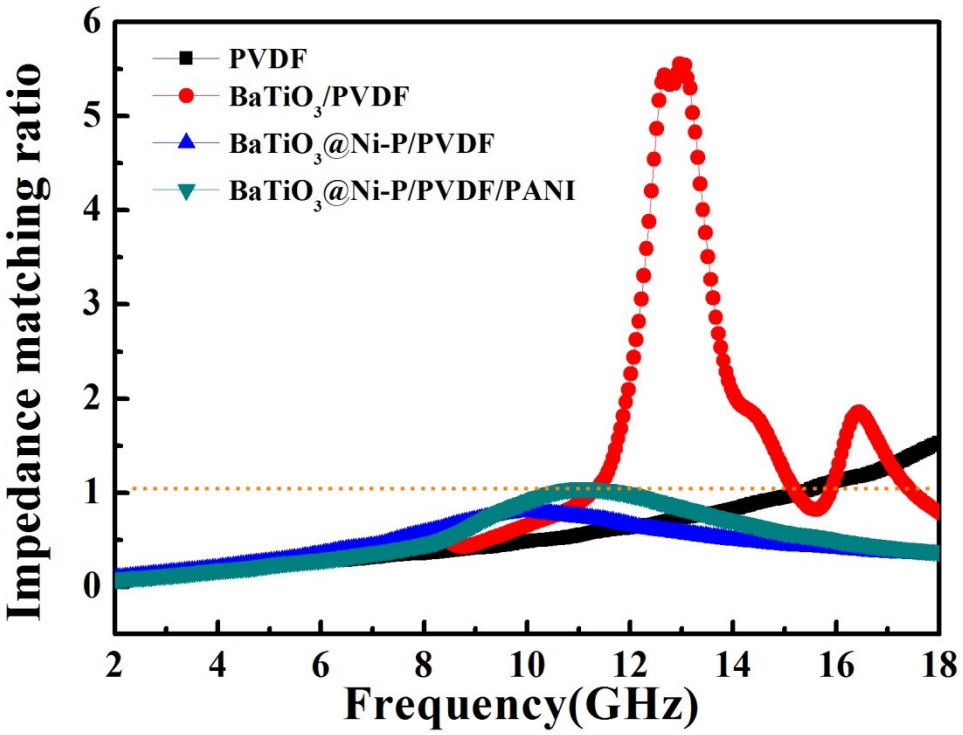

Fig. S7 Impedance matching of samples.

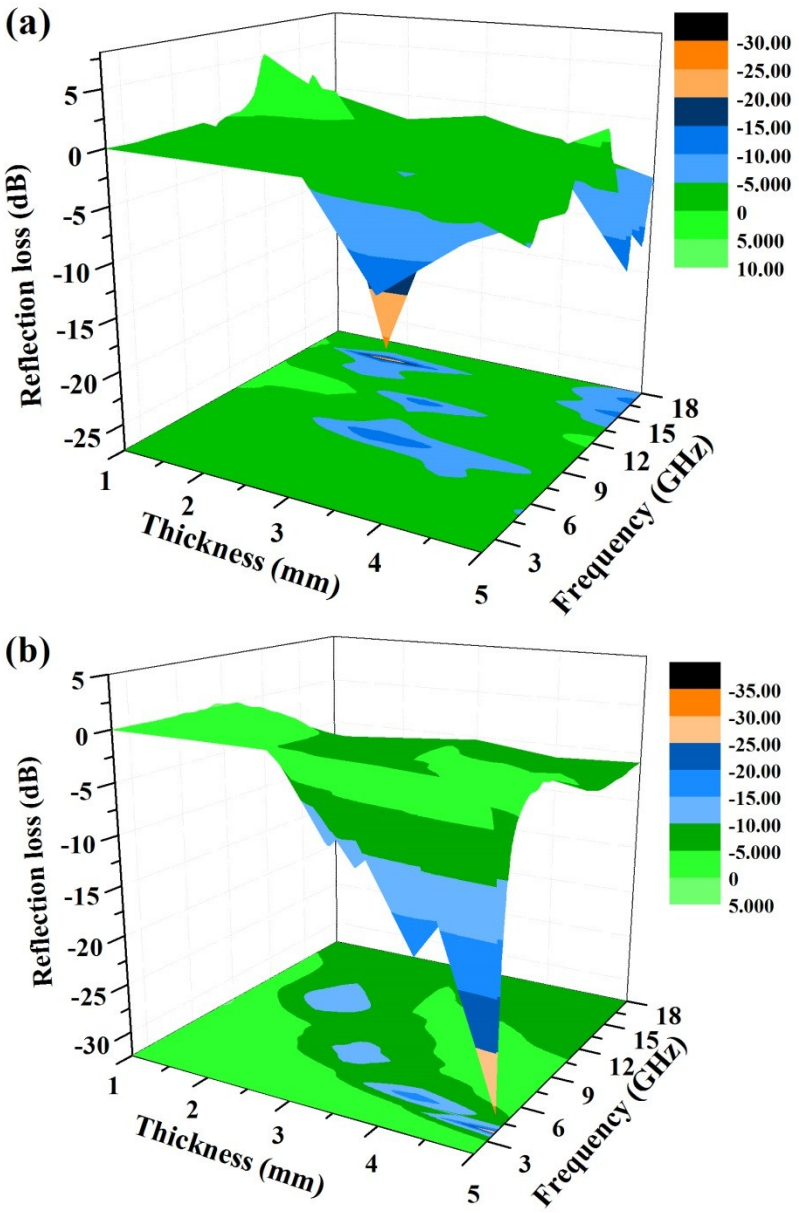

Fig. S8 Reflection loss of (a) $BaTiO_3$/PVDF and (b) $BaTiO_3$@Ni-P/PVDF with different thickness.

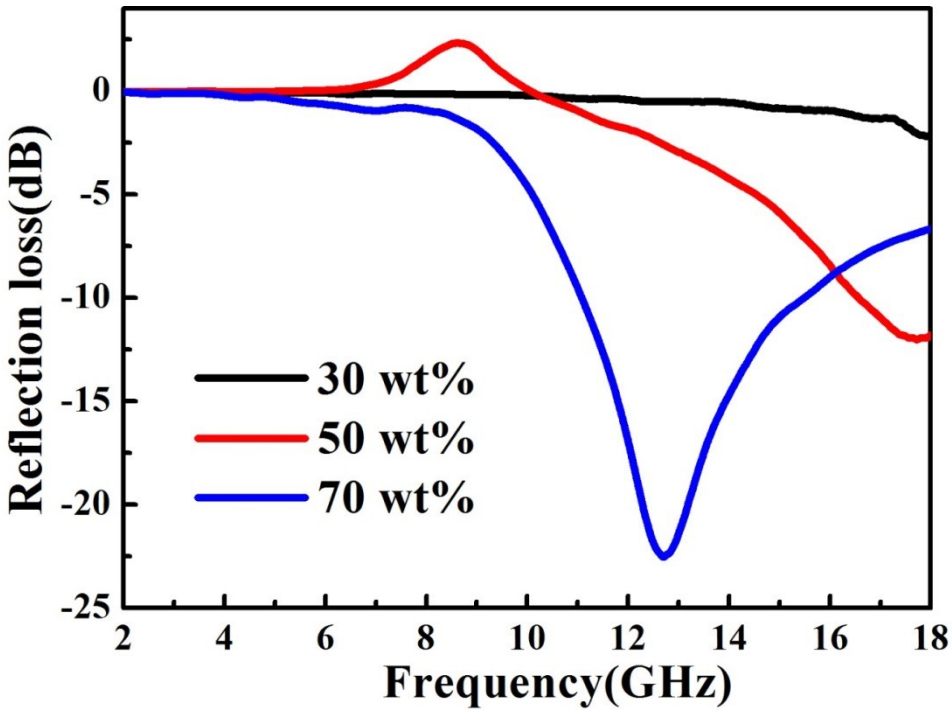

Fig. S9 Reflection loss of $BaTiO_3$@Ni-P/PVDF/PANI with different filler loadings at the thickness of 2 mm.

References

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