

# **Electronic Supplementary Information (ESI)**

## **Core-shell polypyrrole@silicon carbide nanowire (PPy@SiC) nanocomposite for the broadband elimination of electromagnetic pollution**

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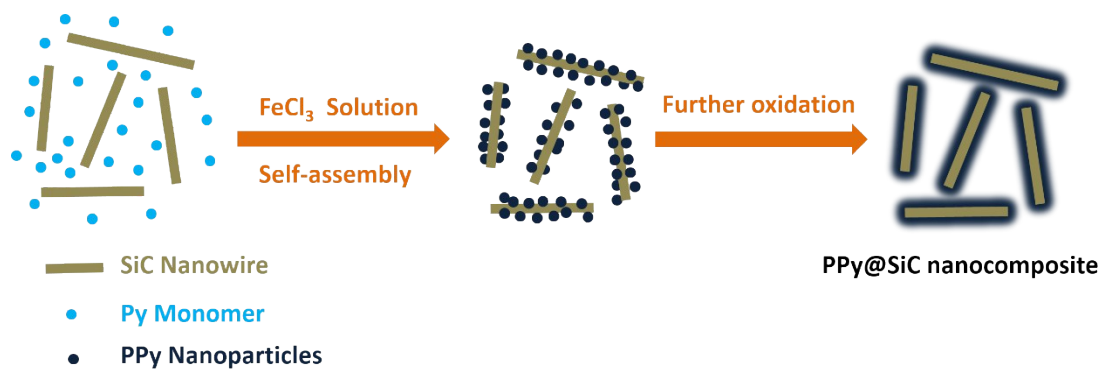
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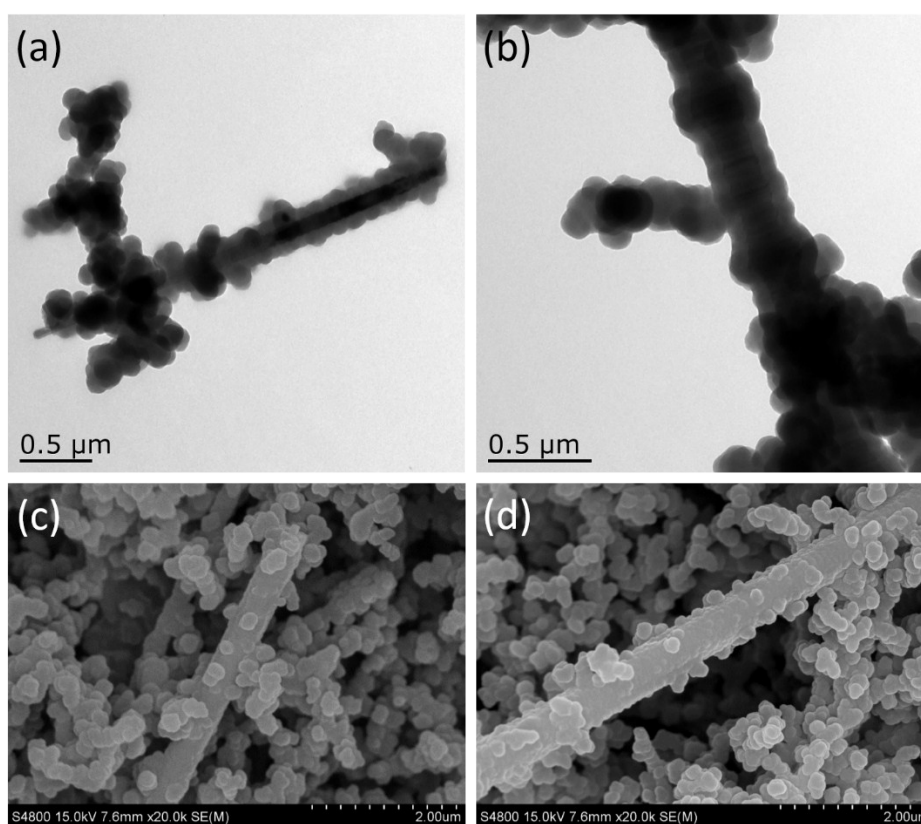
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**Table S1** Typical SiC and PPy based absorbers

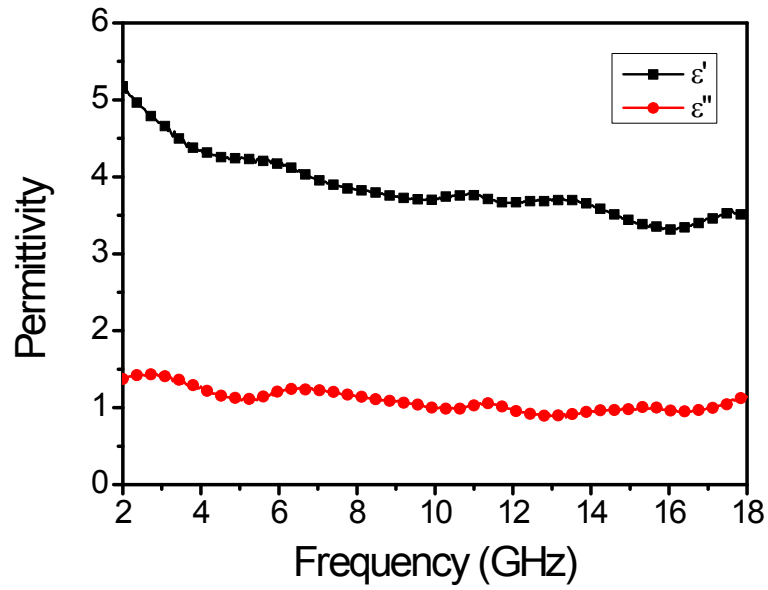
Filler	Matrix	Loading ratio (wt%)	Thickness (mm)	Effective bandwidth (GHz) (RL below – 10 dB)	Ref.
PPy@SiC	Wax	10	2.5	6.52	This work
SiC-Fe <sub>3</sub> O <sub>4</sub>	Wax	50	unknown	4.20	1
SiC/Co	Wax	50	unknown	5.10	2
N doped SiC	Wax	unknown	2.5	≤ 3.00	3
Si <sub>3</sub> N <sub>4</sub> -SiC	Wax	unknown	3.5	4.10	4
PPy aerogel	Wax	7	2.5	6.20	5
PPy/RGO	Wax	10	3.0	6.76	6
Z-BCF/SiO <sub>2</sub> /PPy	Wax	33.3	2.0	5.06	7
PPy particles	Wax	15	2.0	5.48	8



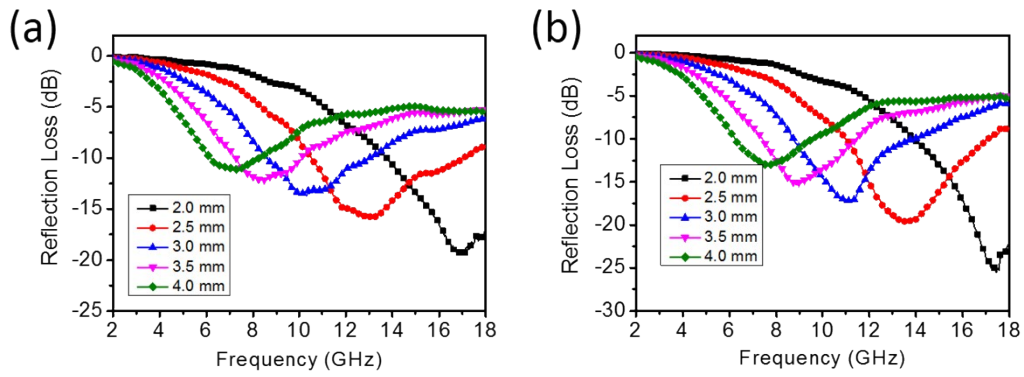
**Scheme S1** The synthetic strategy for core-shell PPy@SiC nanocomposite.



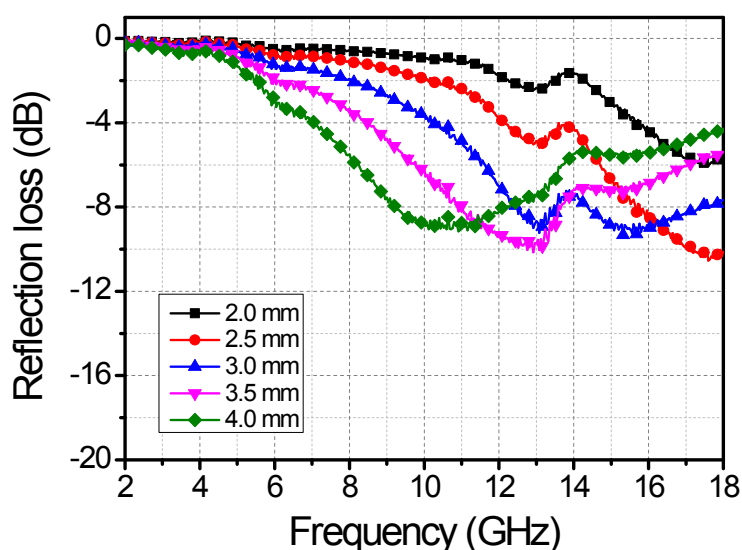
**Fig. S1** SEM and TEM images of sample 1 (a, c) and sample 3 (b, d).



**Fig. S2** Permittivity of SiC nanowire (10 wt%) in wax matrix.



**Fig. S3** RL curves of sample 1 (a) and sample 3 (b) at thicknesses from 2.0 to 4.0 mm.



**Fig. S4** RL curves of 10 wt% SiC nanowire in wax from 2 to 4 mm.

## References

1. C. Liang, C. Liu, H. Wang, L. Wu, Z. Jiang, Y. Xu, B. Shen and Z. Wang, *J. Mater. Chem. A*, 2014, **2**, 16397.
2. H. Wang, L. Wu, J. Jiao, J. Zhou, Y. Xu, H. Zhang, Z. Jiang, B. Shen and Z. Wang, *J. Mater. Chem. A*, 2015, **3**, 6517.
3. Y. Dou, J. Li, X. Fang, H. Jin and M. Cao, *Appl. Phys. Lett.*, 2014, **104**, 052102.
4. G. Zheng, X. Yin, S. Liu, X. Liu, J. Deng and Q. Li, *J. Eur. Ceram. Soc.*, 2013, **33**, 2173.
5. A. Xie, F. Wu, M. Sun, X. Dai, Z. Xu, Y. Qiu, Y. Wang, M. Wang, *Appl. Phys. Lett.*, 2015, **106**, 222902.
6. F. Wu, A. Xie, M. Sun, Y. Wang, M. Wang, *J. Mater. Chem. A*, 2015, **3**, 14358.
7. J. Shen, K. Chen, L. Li, W. Wang, Y. Jin, *J. Alloy. Comp.*, 2014, **615**,

488-495.

8. A. Xie, W. Jiang, F. Wu, X. Dai, M. Sun, Y. Wang and M. Wang, *J. Appl. Phys.*, 2015, **118**, 204105.