Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supporting Information

Construction of flexible 1D core-shell Al_2O_3@$NaNbO_3$ nanowires/poly-(*p*-phenylene benzobisoxazole) nanocomposite with stable and enhanced dielectric properties in an ultra-wide temperature range

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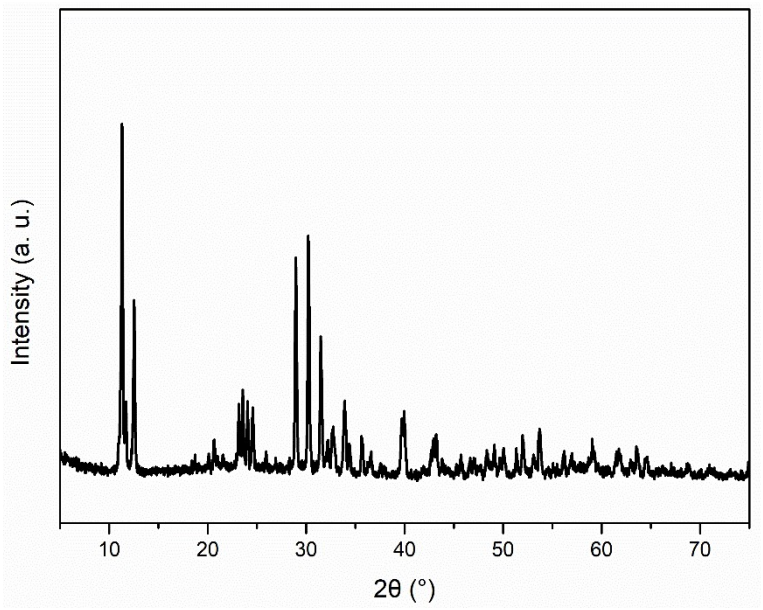

Fig. S1 XRD pattern of $Na_2Nb_2O_6 \cdot 2/3H_2O$

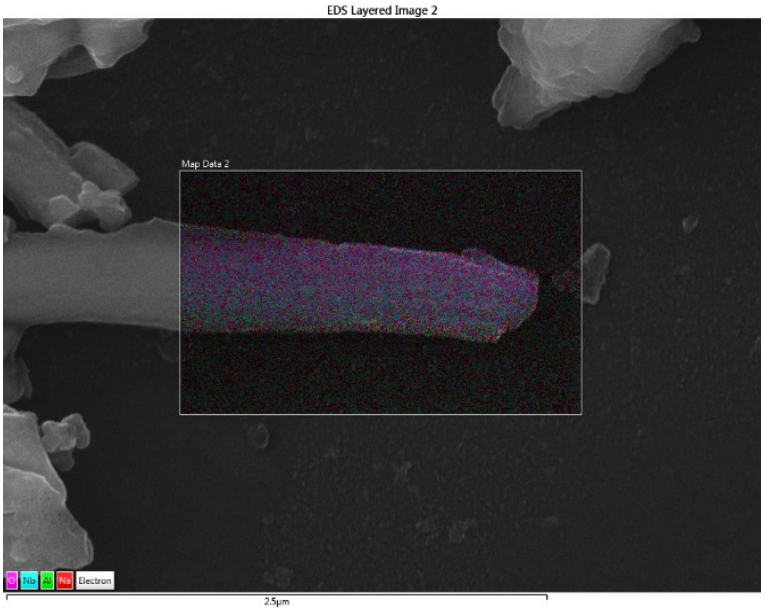

Fig. S2 EDS image of Al_2O_3@$NaNbO_3$

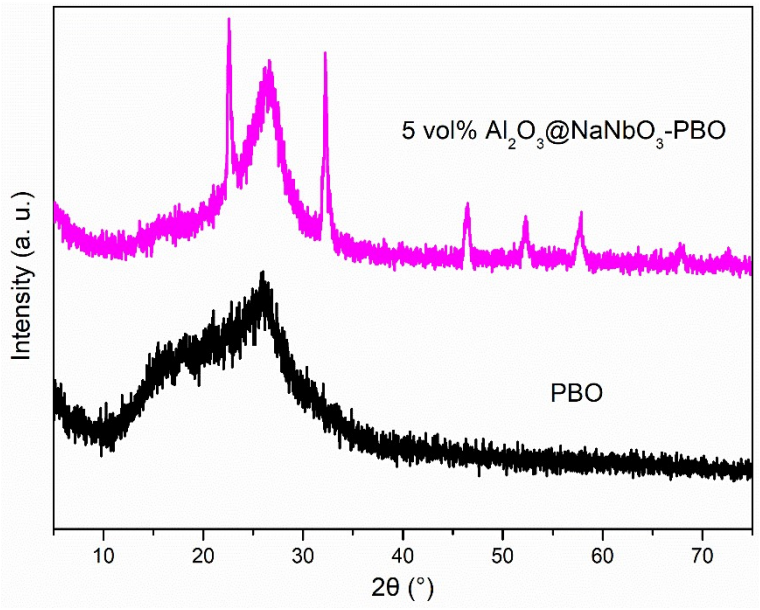

Fig. S3 XRD patterns of PBO and 5 vol% Al_2O_3@$NaNbO_3$−PBO

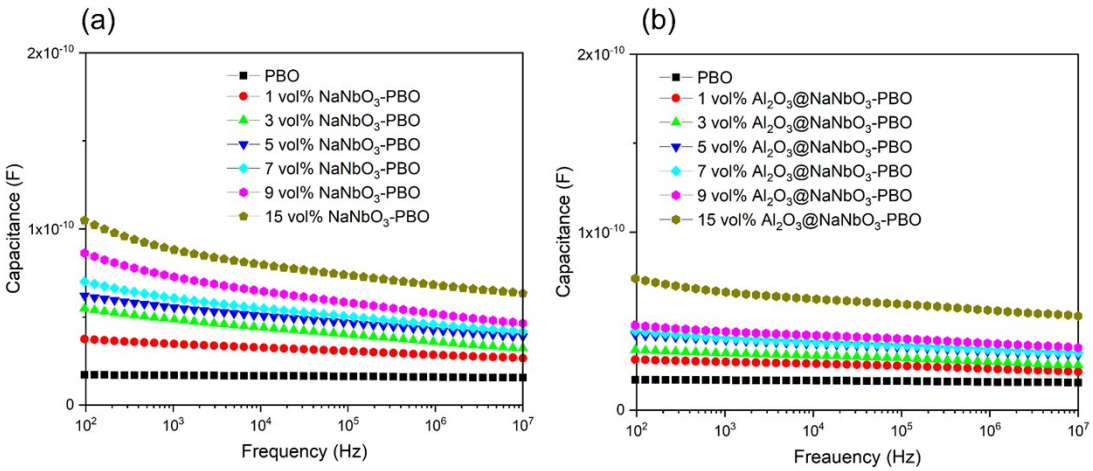

Fig. S4 The frequency dependent capacitance of $NaNbO_3$-PBO (a) and Al_2O_3@$NaNbO_3$-PBO (b)

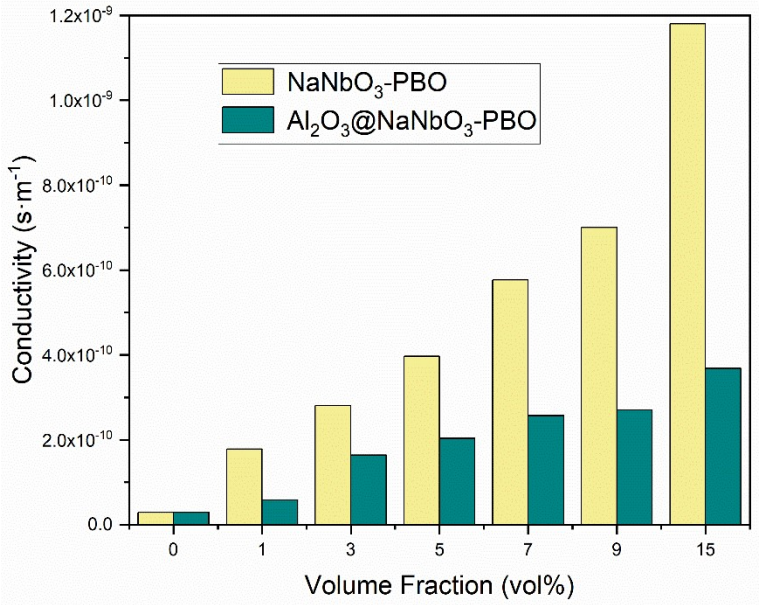

Fig. S5 Conductivities of $NaNbO_3$-PBO and Al_2O_3@$NaNbO_3$-PBO at 1K Hz with various contents of fillers

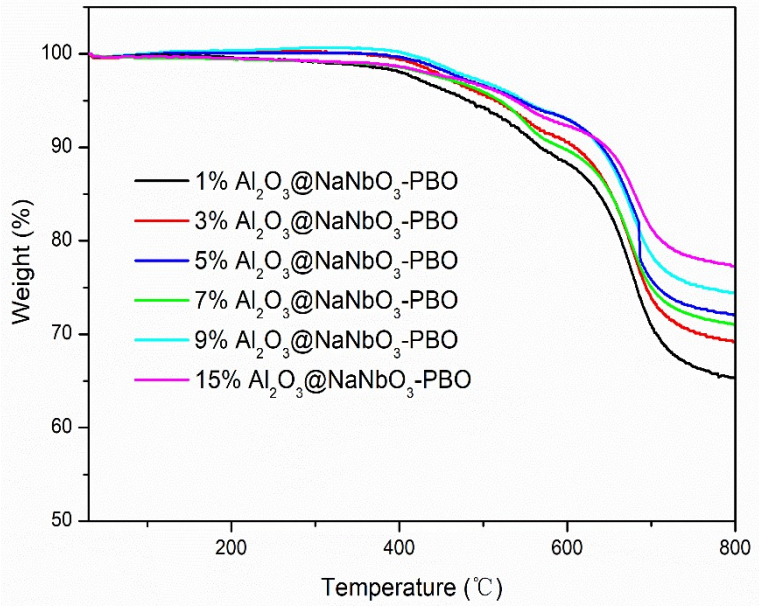

Fig. S6 TGA curves of Al_2O_3@$NaNbO_3$-PBO with different filler contents

Table S1 The dielectric properties of the prepared composite and some related polymeric dielectrics reported in previous literatures

Materials	Dielectric Constant	Dielectric Loss	Testing Temperature(℃)	Breakdown Strength (kV/mm)	Ref
12 wt% Fe_3O_4@C@PANI/PBO	164	0.047	25	195	S1
1.5 wt% RGO-P(o-HPMMA)/P(2-IBO)	8.35	0.11	25	--	S2
2 wt% GNs-HAP/PBO	66.27	0.045	200	130	S3
4 wt% GO-NH_2/PI	37	0.008	25	135	S4
20 wt% PANI@RGO/PI	25.84	0.11	25	--	S5
20 vol% BT-HCuPc/PES	9.8	0.044	25	290	S6
5 wt% BT@PI/PVDF	15	0.046	25	180	S7
10 vol% Bi_2Te_3@Al_2O_3/PVDF	140	0.05	25	--	S8
7.5 vol% 2D Al_2O_3/*c*-BCB	3.5	0.002	150	489	S9
1.4 vol% HPSi-*d*-$Ti_3C_2T_x$/PDMS	15	0.11	25	--	S10
3 vol% 1D Al_2O_3@$NaNbO_3$/PBO	5.94	0.036	250	286	This work

Reference

1 Q. Liu, Z. Cheng, J. Qian, X. Chen, Y. Zhang and Q. Zhuang, *J. Mater. Chem. A*, 2019, **7**, 11195-11204.

2 Y. Chen, S. Zhang, X. Liu, Q. Pei, J. Qian, Q. Zhuang and Z. Han, *Macromolecules*, 2015, **48**, 365-372.

3 H. Feng, W. Ma, Z.-K. Cui, X. Liu, J. Gu, S. Lin and Q. Zhuang, *J. Mater. Chem. A*, 2017, **5**, 8705-8713.

4 X. Fang, X. Liu, Z.-K. Cui, J. Qian, J. Pan, X. Li and Q. Zhuang, *J. Mater. Chem. A*, 2015, **3**, 10005-10012.

5 H. Feng, X. Fang, X. Liu, Q. Pei, Z.-K. Cui, S. Deng, J. Gu and Q. Zhuang, *Compos. Pt. A-Appl. Sci. Manuf.*, 2018, **109**, 578-584.

6 W. Xu, G. Yang, L. Jin, J. Liu, Y. Zhang, Z. Zhang and Z. Jiang, *ACS Appl. Mater. Interfaces*, 2018, **10**, 11233-11241.

7 X. Xie, C. Yang, X.-d. Qi, J.-h. Yang, Z.-w. Zhou and Y. Wang, *Chem. Eng. J.*, 2019, **366**, 378-389.

8 J. Chen, X. Wang, X. Yu, L. Yao, Z. Duan, Y. Fan, Y. Jiang, Y. Zhou and Z. Pan, *J. Mater. Chem. C*, 2018, **6**, 271-279.

9 H. Li, D. Ai, L. Ren, B. Yao, Z. Han, Z. Shen, J. Wang, L. Q. Chen and Q.

Wang, *Adv. Mater.*, 2019, **31**, e1900875.
10 L. Wei, J. W. Wang, X. H. Gao, H. Q. Wang, X. Z. Wang and H. Ren, *ACS Appl. Mater. Interfaces*, 2020, **12**, 16805-16814.