

**Largely Enhanced Energy Density of BOPP-OBT@CPP-BOPP Sandwich-  
structured Dielectric Composites**

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## Supplementary information

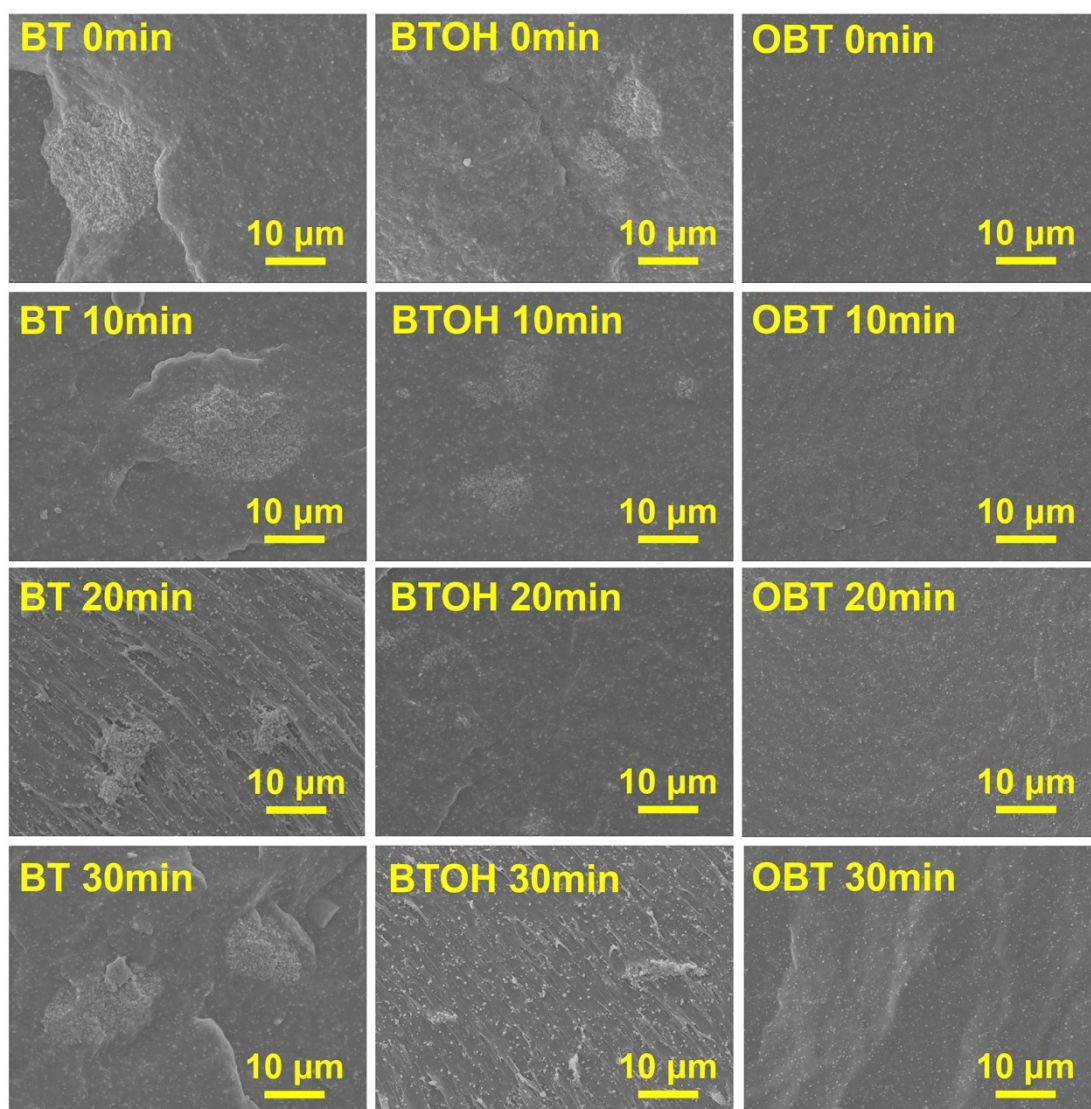


Fig. S1. The cross-sectional SEM images of BT, BTOH, and OBT in CPP with different sonication time.

Table S1. Atomic Ratio of OBT Detected by XPS.

	Si	C	Ti	O	Ba
Atomic%	5.87	54.86	6.08	29.07	4.12

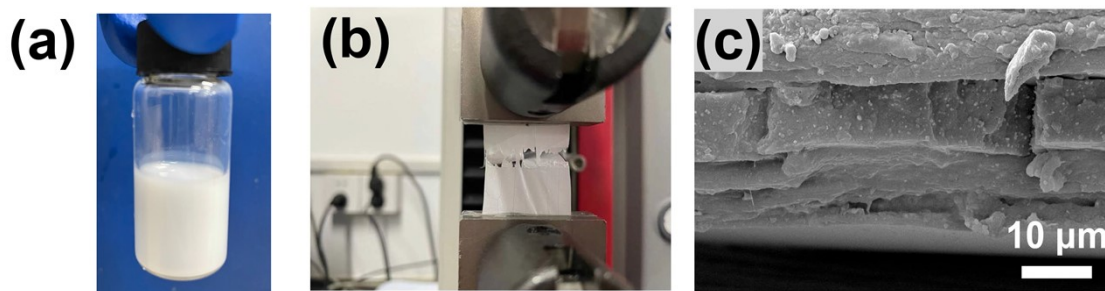


Fig. S2. (a) Photograph of OBT@CPP coating (50 wt% OBT) after setting for more than a month showed a very good anti-sedimentation performance, (b) Peeling process of BCB composite films and (c) SEM image of the surface morphology of tensile fracture of the composite film also showed a good dispersion of OBT nanoparticles in the CPP matrix.

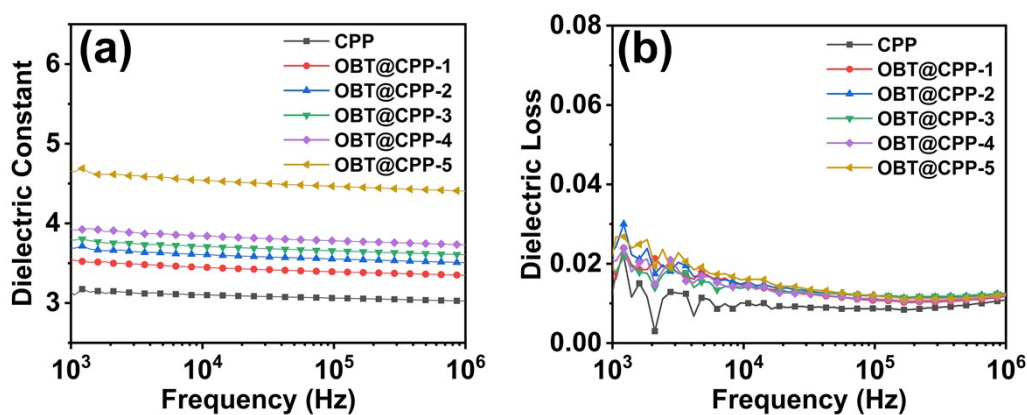


Fig. S3. Frequency dependences of (a) dielectric constant and (b) dielectric loss for the middle layer CPP. Compared to CPP, the OBT@CPP (1-5 represents the 10-50 wt% of OBT in CPP, separately) showed stepwise growth, and the dielectric loss maintained as low as 2%. The excellent dielectric properties of the middle layer composite are the key to improving the dielectric properties of sandwich-structured films.

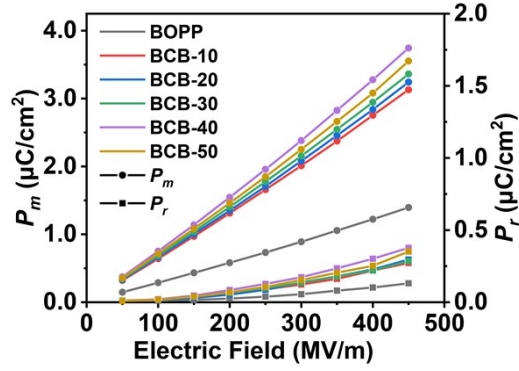
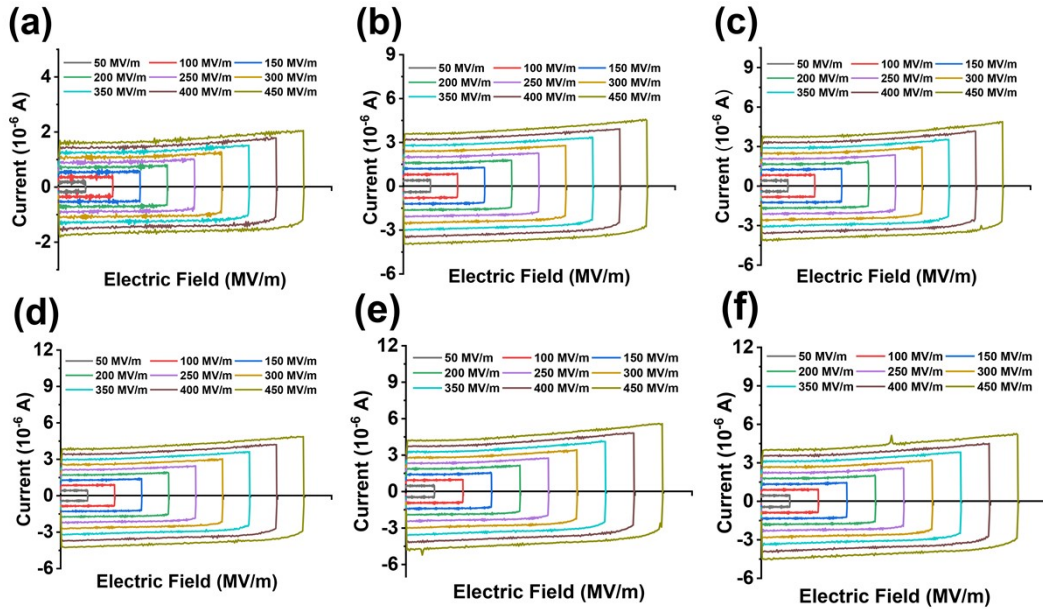


Fig. S4. Maximum polarization ( $P_m$ ) and remnant polarization ( $P_r$ ) of BOPP and BCB composite films. The higher value of maximum polarization is, the higher value of remnant polarization is, and the overall discharged energy density and charge-discharge efficiency is determined by difference of  $P_m$  and  $P_r$ .

Table S2.  $P_m$  and  $P_r$  of BOPP and BCB composite films at 450 MV/m.

	BOPP	BCB-10	BCB-20	BCB-30	BCB-40	BCB-50
$P_m$ ( $\mu\text{C}/\text{cm}^2$ )	1.40	3.13	3.24	3.36	3.74	3.55
$P_r$ ( $\mu\text{C}/\text{cm}^2$ )	0.13	0.27	0.29	0.28	0.38	0.35



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ig. S5. Current-electric field curves of (a) BOPP, (b) BCB-10, (c) BCB-20, (d) BCB-30, (e) BCB-40 and (f) BCB-50 composite films.