

Supporting information

Achieving high energy density and discharge efficiency in multi-layered PVDF– PMMA nanocomposites composed of 0D BaTiO₃ and 1D NaNbO₃@SiO₂

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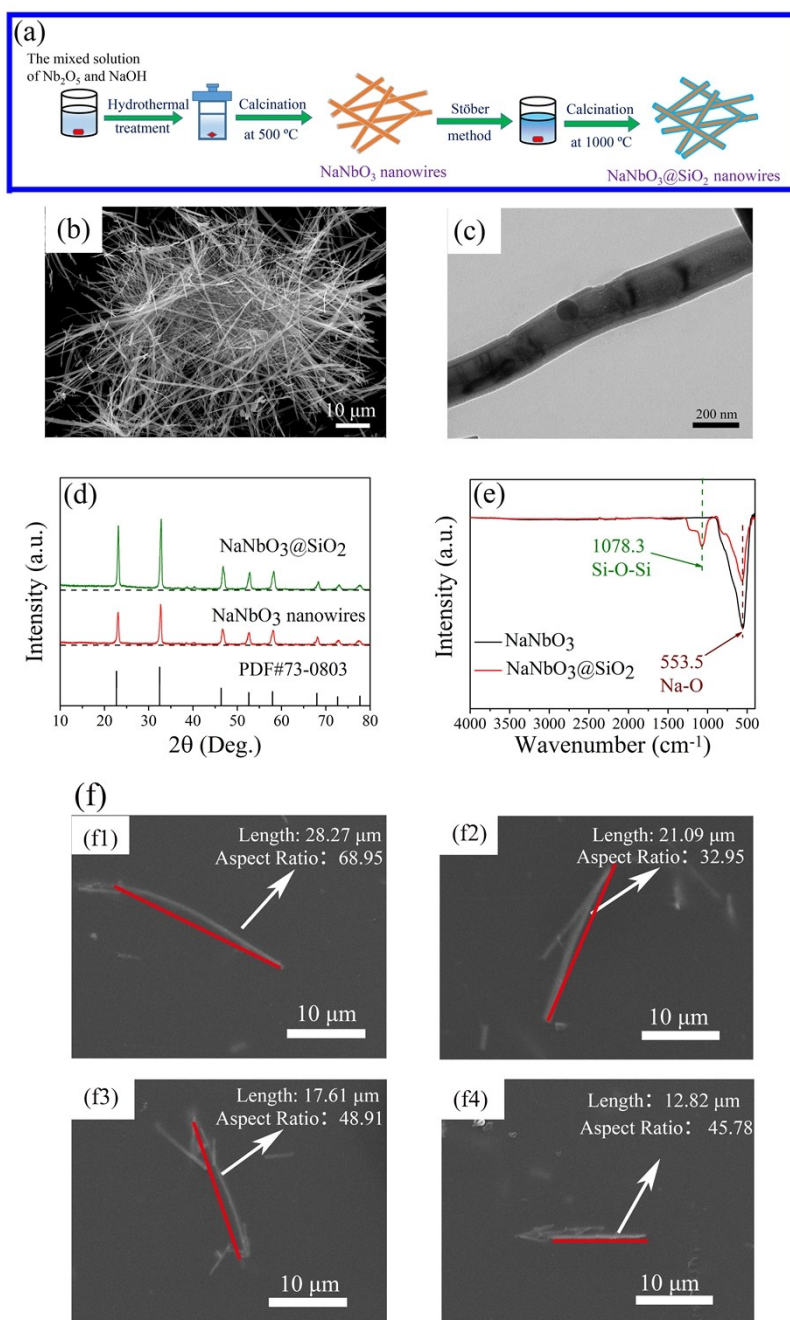


Figure S1. (a) Schematic illustrations of the fabrication process of $\text{NaNbO}_3@SiO_2$ nanowires. (b) The SEM images of NaNbO_3 nanowires. (c) The HRTEM of $\text{NaNbO}_3@SiO_2$ nanowires. (d) The XRD patterns of NaNbO_3 nanowires and $\text{NaNbO}_3@SiO_2$ nanowires. (e) FT-IR spectra of NaNbO_3 nanowires and $\text{NaNbO}_3@SiO_2$ nanowires. (f) The SEM image of the surface of $\text{NaNbO}_3@SiO_2/PVDF-PMMA$ (the volume fraction of $\text{NaNbO}_3@SiO_2$ is 1 vol%), (f1)-(f4) are different scanning locations on the surface of film.

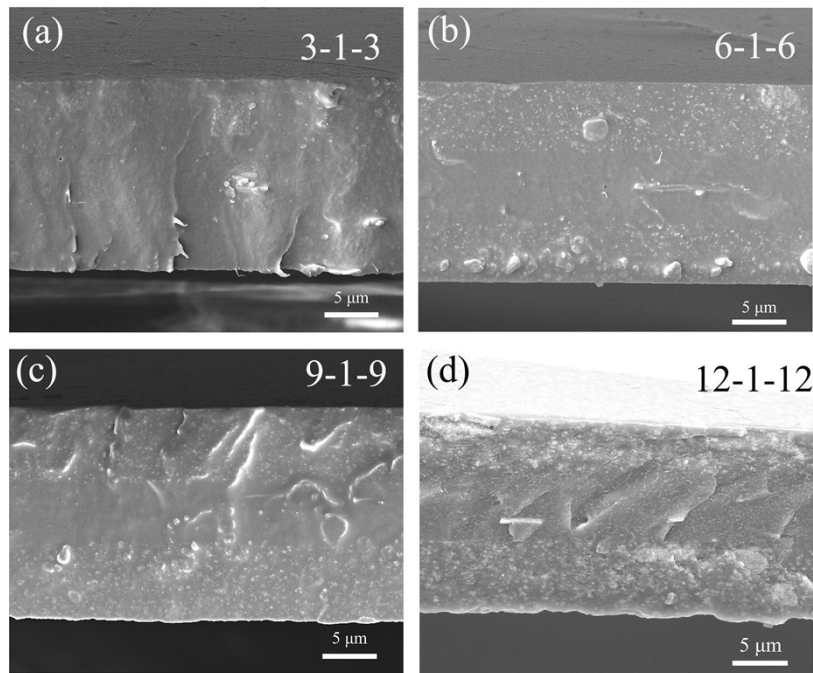


Figure S2. The cross-sectional SEM images of sandwich-structured nanocomposites.

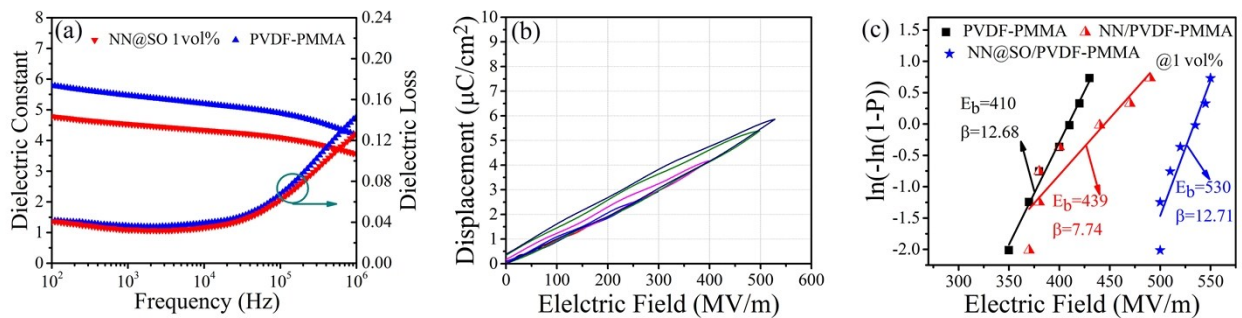


Figure S3. (a) The dielectric constant and loss of NN@SO/PVDF-PMMA and PVDF-PMMA monolayer films. (b) The D-E loops of NN@SO/PVDF-PMMA monolayer films. (c) The Weibull distribution and deduced characteristic breakdown strength of monolayer nanocomposites with NaNbO_3 and $\text{NaNbO}_3@\text{SiO}_2$ nanowires.

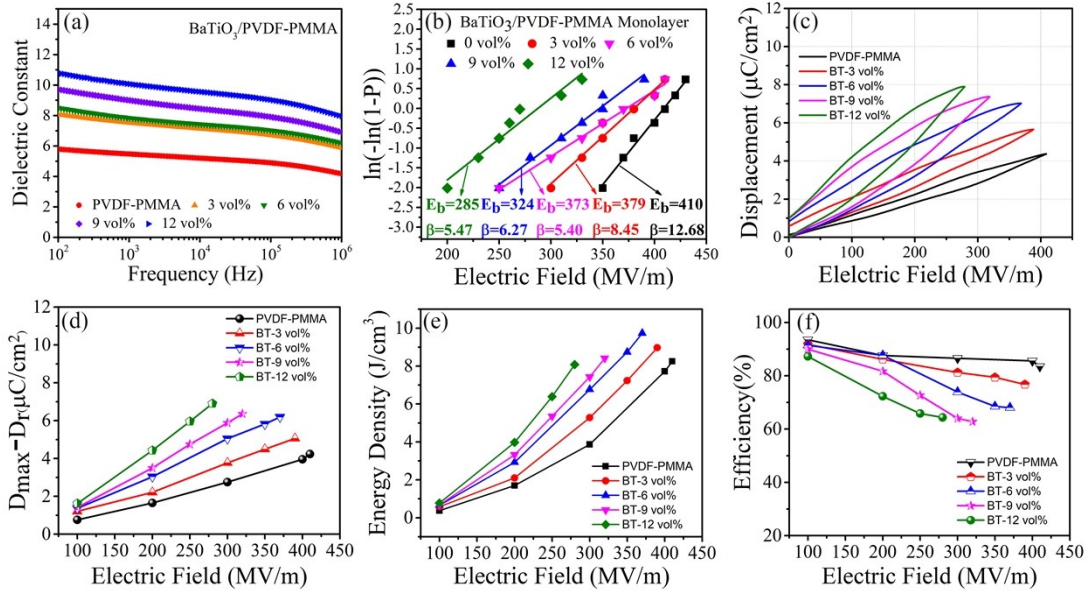


Figure S4. The (a) dielectric constant (b) Weibull distribution and deduced characteristic breakdown strength; (c) D-E loops; (e) $D_{\text{max}} - D_r$; (e) Electric field dependent energy density and (f) discharge efficiency of BT/PVDF-PMMA monolayer nanocomposites.

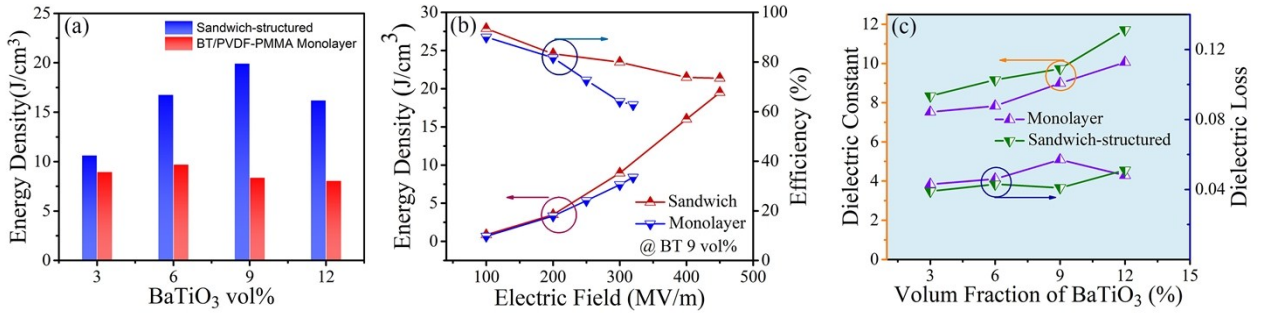


Figure S5. (a) The comparison of the energy density for different structured nanocomposites. (b) The comparison of the energy density and efficiency for different structured nanocomposites with 9 vol% BT. (c) The comparison of the dielectric constant and loss for different structured nanocomposites at 1kHz.