Supplementary Material

Laminated ferroelectric polymer composites exhibiting synchronous ultrahigh discharge efficiency and energy density via utilizing multiple-interface barriers

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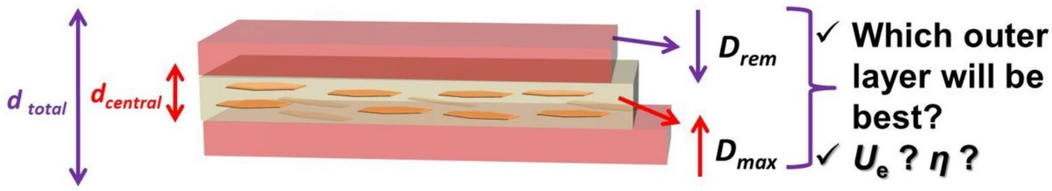

Fig. S1. Schematic illustration of tri-layered structure composite film.

Fig. S2. Optical images of a) P(VDF-HFP)-S, b) 50 wt% PMMA-S and c) PMMA-S, respectively.

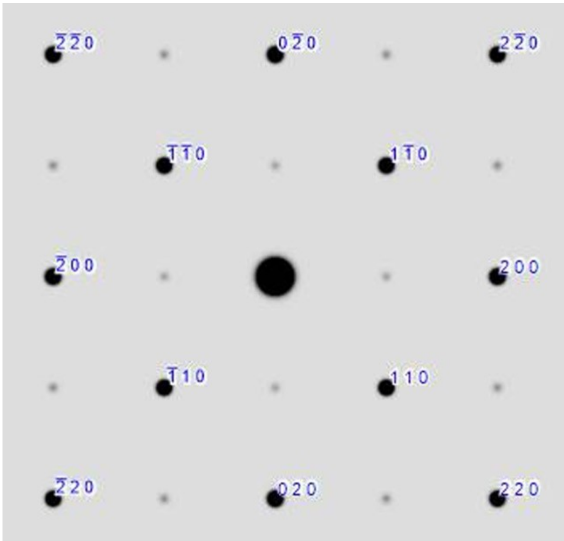

Fig. S3. SAED pattern of the prepared $SrTiO_3$@PDA plates.

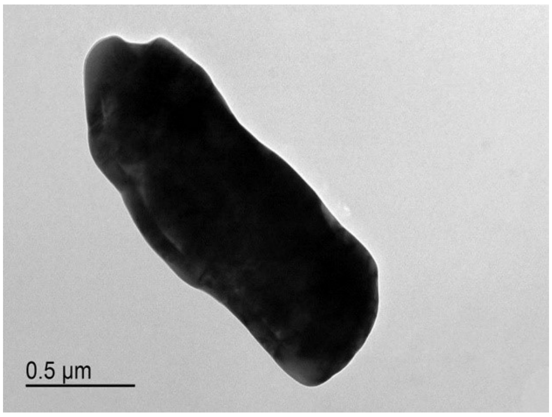

Fig. S4. TEM image of the prepared $SrTiO_3$@PDA plates.

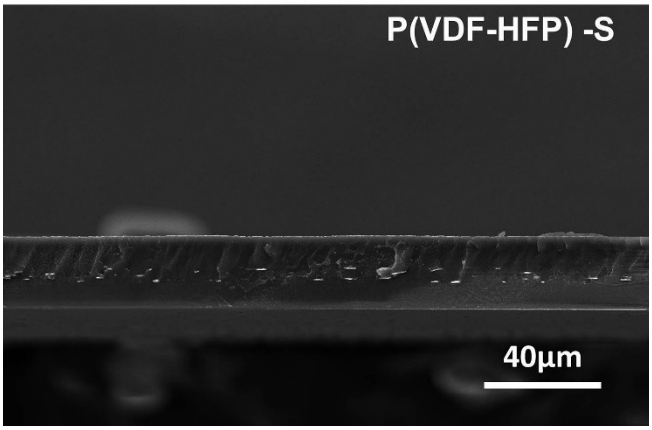

Fig. S5. Cross-section SEM image with a large scale of P(VDF-HFP)-S film, scale bar 40 μm.

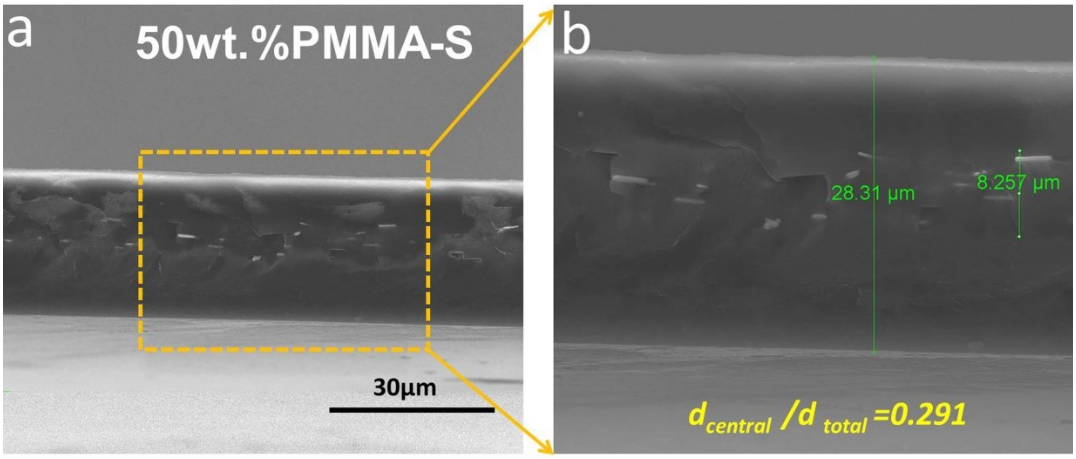

Fig. S6. a) Cross-section SEM image, (b) magnified SEM image of 50 wt.% PMMA-S film.

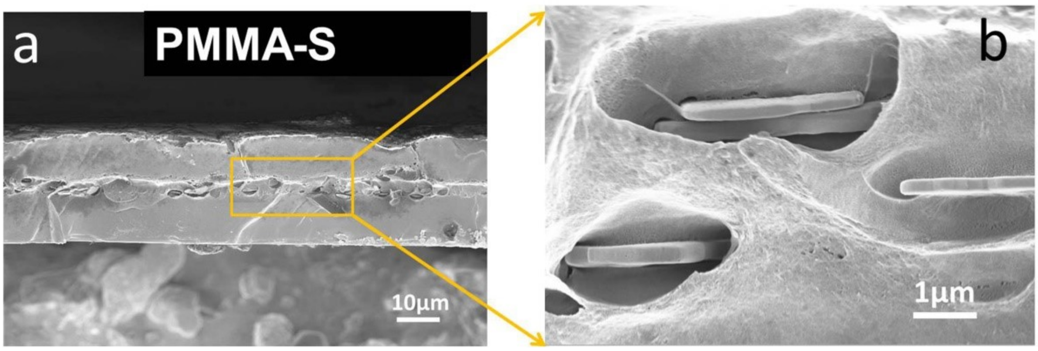

Fig. S7. a) Cross-section SEM image, (b) magnified SEM image of PMMA-S film.

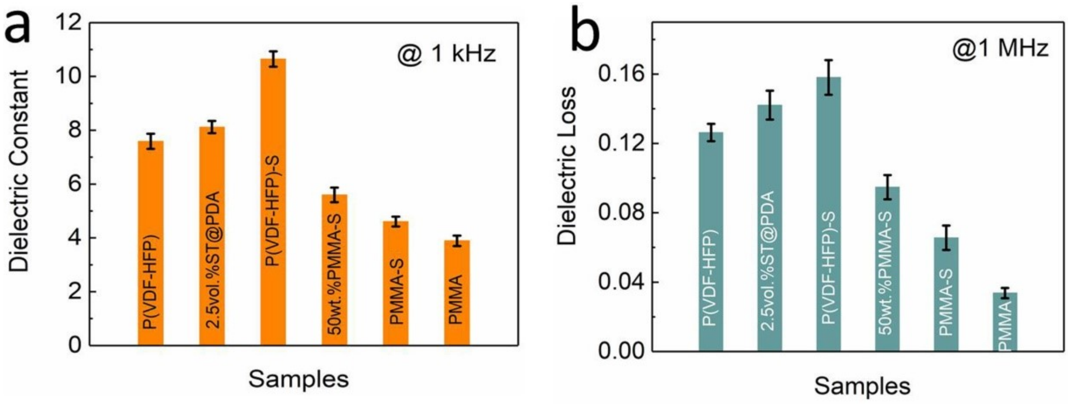

Fig. S8. a) dielectric constant at 1 kHz, b) dielectric loss at 1 MHz of the tri-layered configuration composites, single-layered configuration composite and pristine constituent polymers.

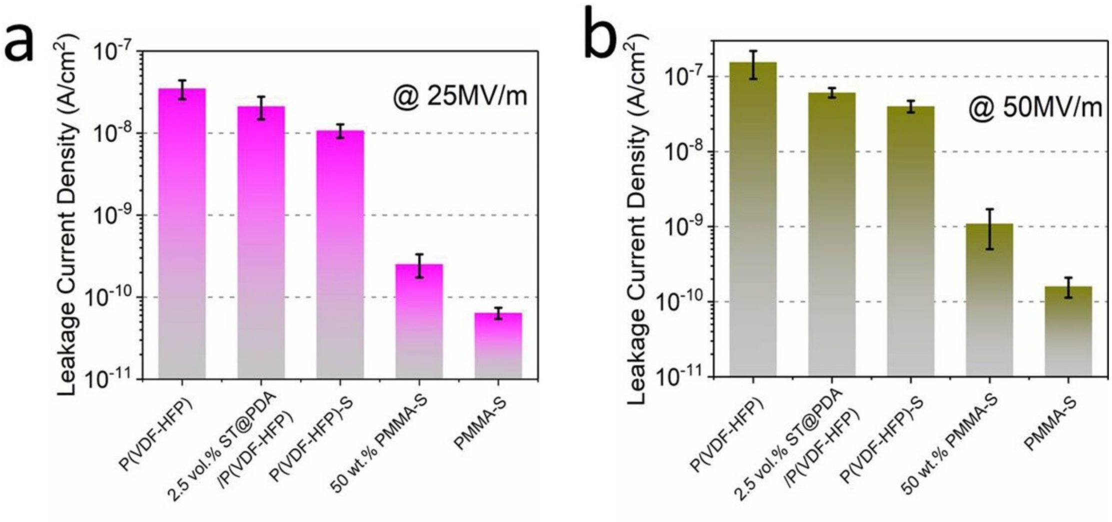

Fig. S9. Leakage current density a) measured at 25 MV m^{-1} and b) measured at 50 MV m^{-1} of tri-layered configuration composites, single-layered configuration composite, and pristine P(VDF-HFP).

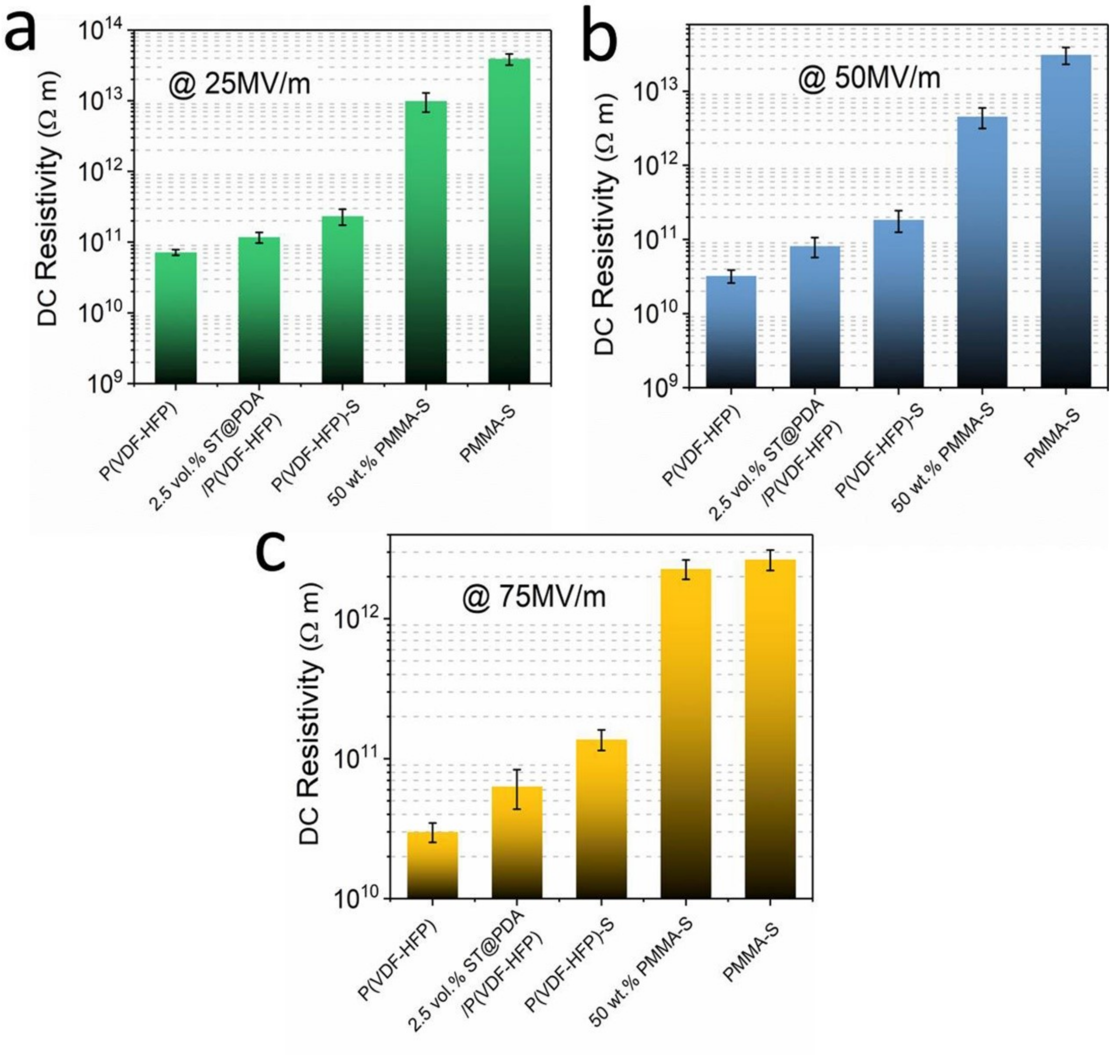

Fig. S10. DC electrical resistivity a) measured at 25 MV m^{-1}, b) measured at 50 MV m^{-1}, and c) measured at 75 MV m^{-1} of tri-layered configuration composites, single-layered configuration composite, and pristine P(VDF-HFP).

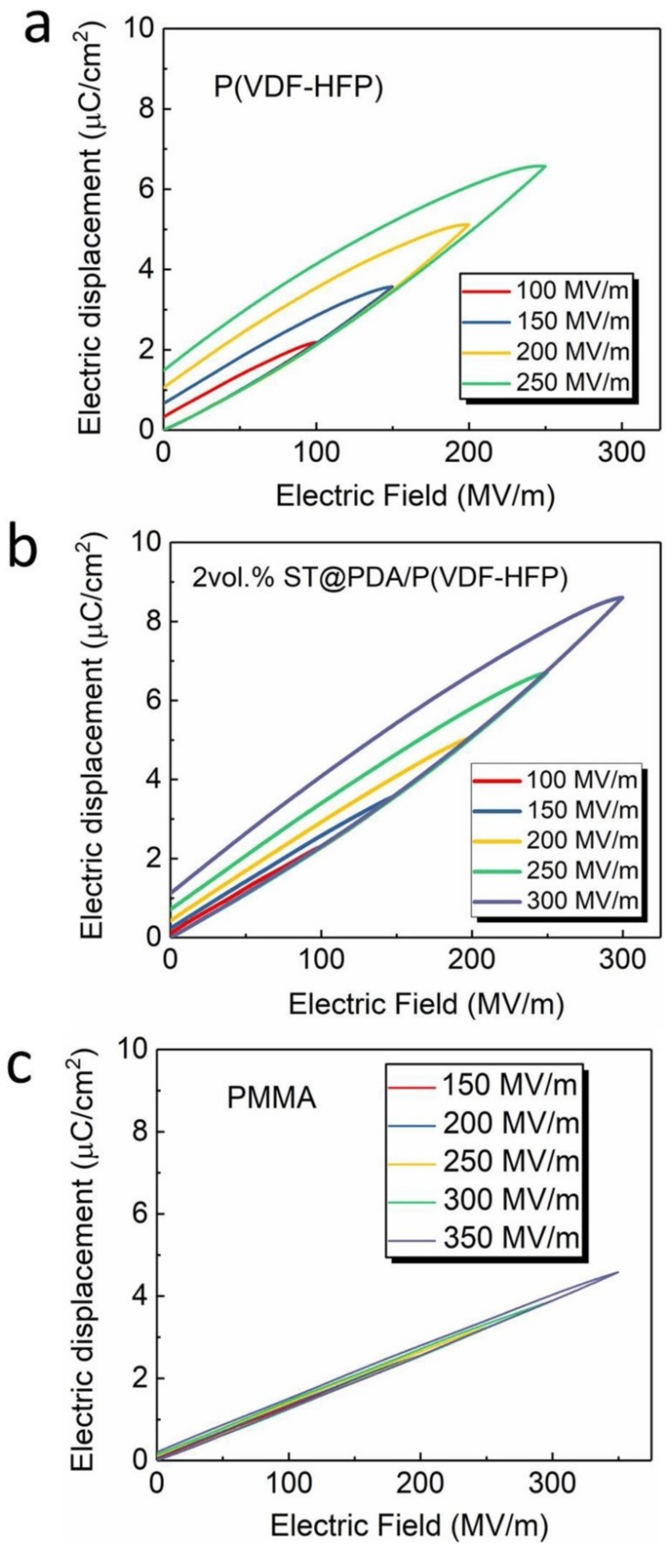

Fig. S11. Unipolar electric displacement–electric fields (*D*–*E*) loops at varied electric fields of a) pristine P(VDF-HFP), b) single layer composite with 2.5 vol.% ST@PDA platelets and c) PMMA.

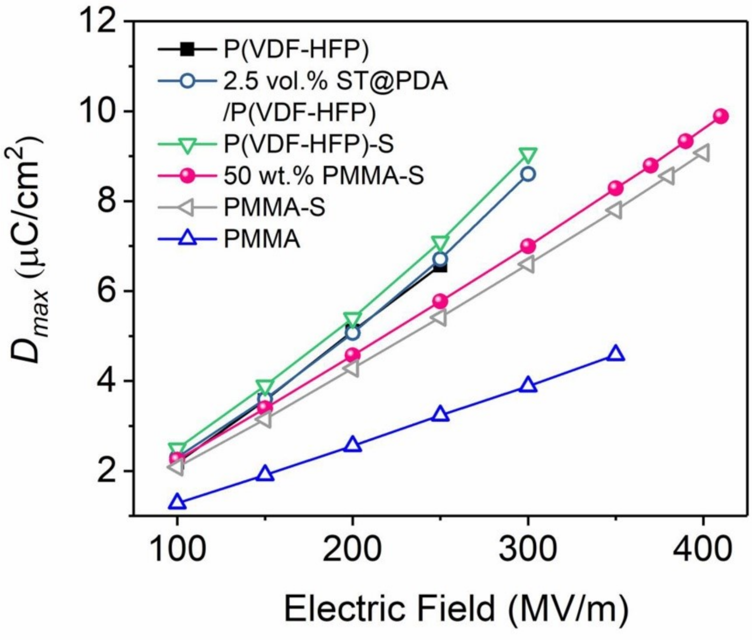

Fig. S12. Maximum displacement at varied electric fields of pristine P(VDF-HFP), single layer composite with 2.5 vol.% ST@PDA platelets, and tri-layered composites.

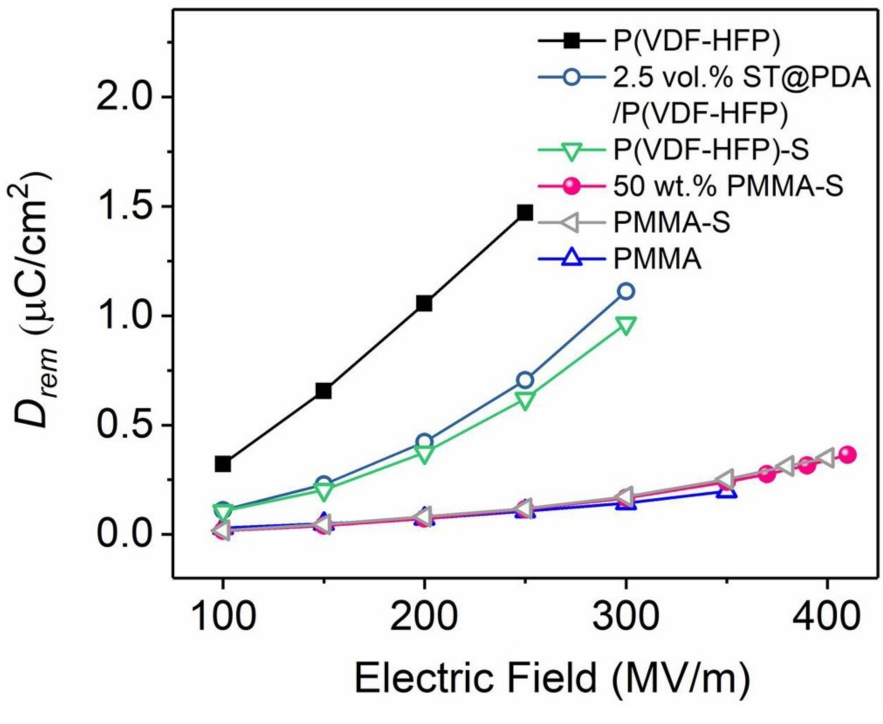

Fig. S13. Remnant displacement at varied electric fields of pristine P(VDF-HFP), single layer composite with 2.5 vol.% ST@PDA platelets, and tri-layered composites.

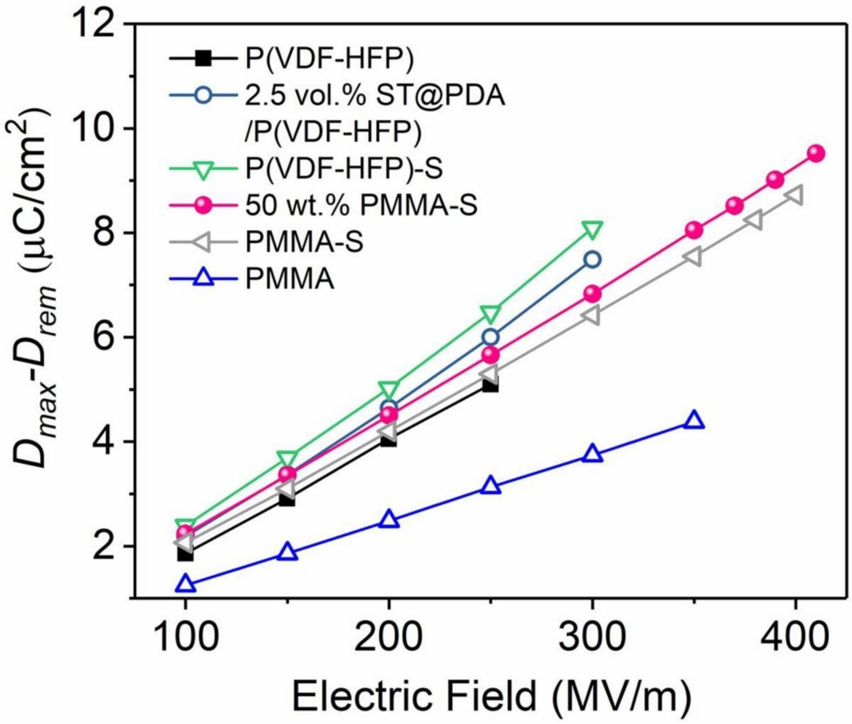

Fig. S14. Electric displacement difference at varied electric fields of pristine P(VDF-HFP), single layer composite with 2.5 vol.% ST@PDA platelets, and tri-layered composites.

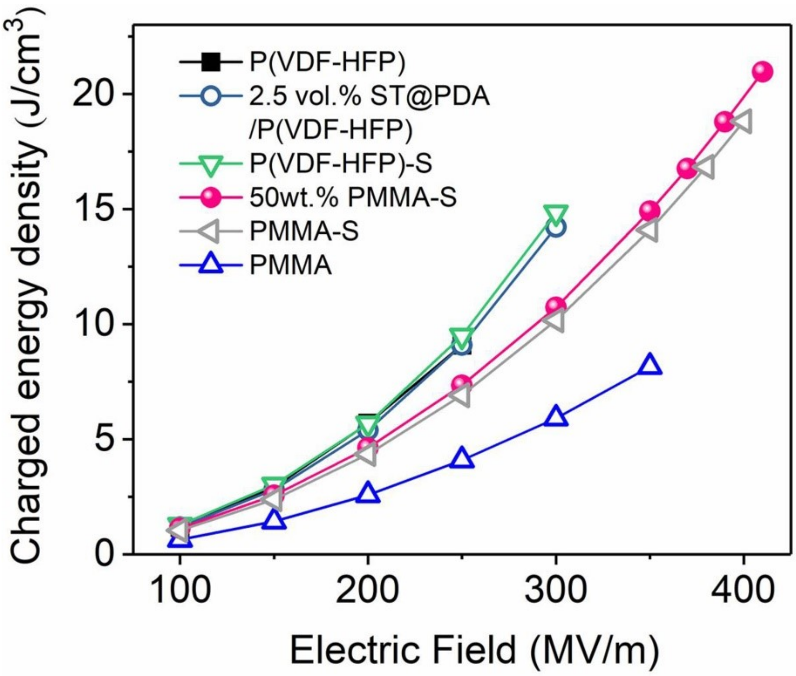

Fig. S15. Charged energy density at varied electric fields of pristine P(VDF-HFP), single layer composite with 2.5vol% ST@PDA platelets, and tri-layered composites.

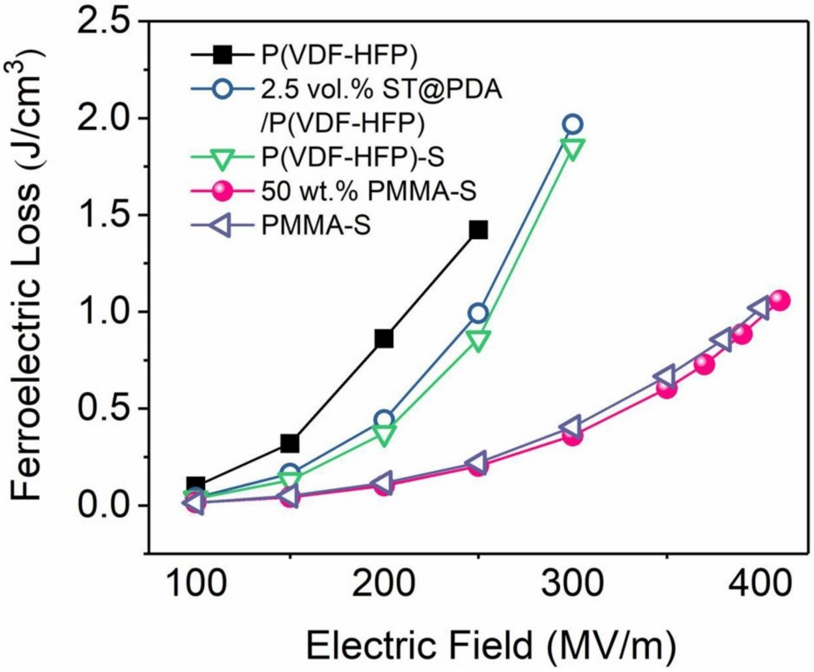

Fig. S16. Ferroelectric loss at varied electric fields of pristine P(VDF-HFP), single layer composite with 2.5 vol% ST@PDA platelets, and tri-layered composites.

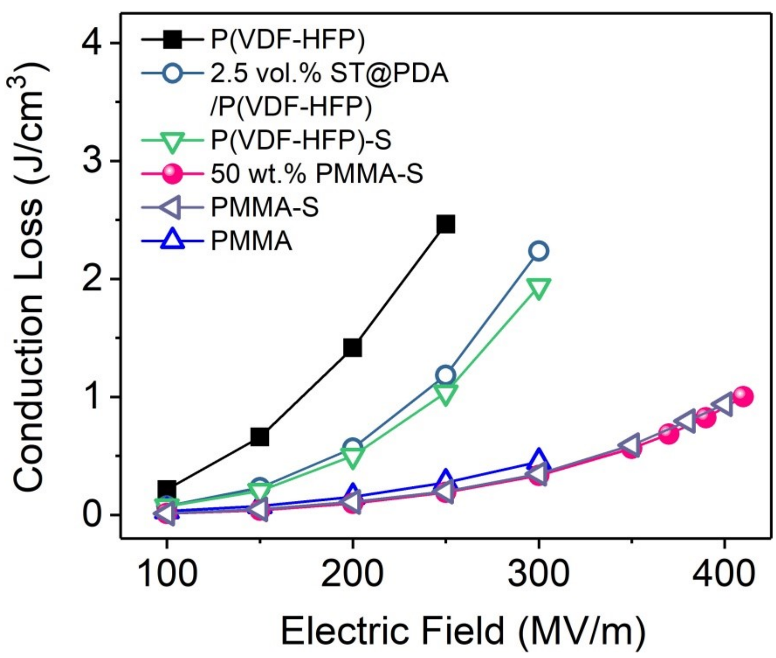

Fig. S17. Conduction loss at varied electric fields of pristine P(VDF-HFP), single layer composite with 2.5 vol% ST@PDA platelets, and tri-layered composites.

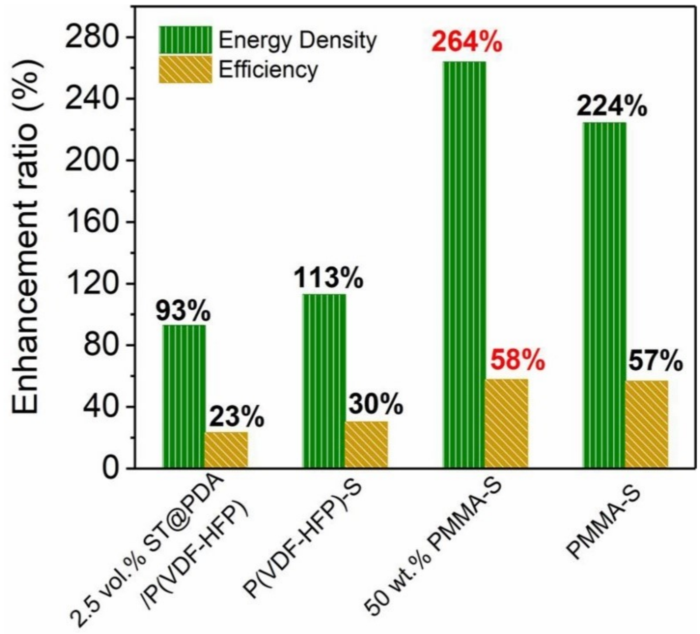

Fig. S18. Enhancement ratio at breakdown electric fields of single layer composite with 2.5 vol% ST@PDA platelets and tri-layered composites in comparison with pristine P(VDF-HFP).

Fig. S19. Optical image of 50 wt% PMMA-S after winding test (1 mouth).

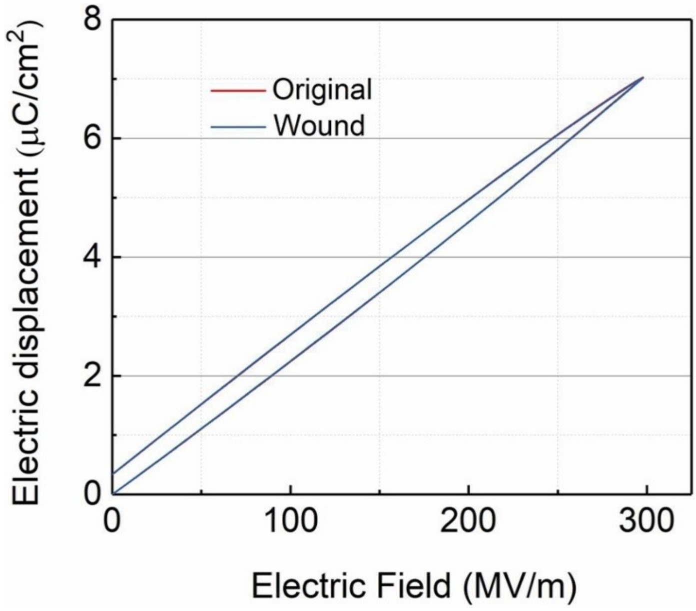

Fig. S20. Unipolar electric displacement–electric fields (*D*–*E*) loops at 300 MV m^{-1} of 50 wt% PMMA-S before and after wound tests.

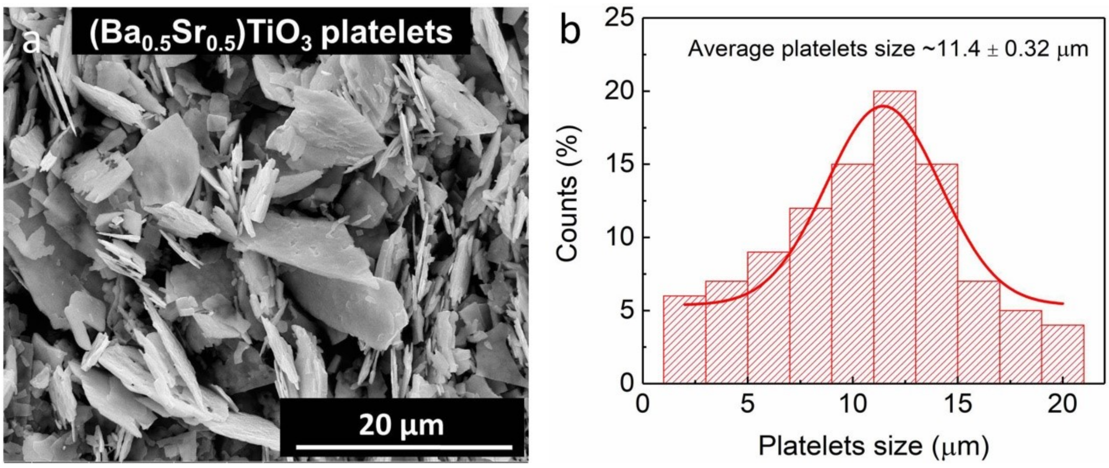

Fig. S21. Platelets size distributions of $Ba_{0.5}Sr_{0.5}TiO_3$ platelets.

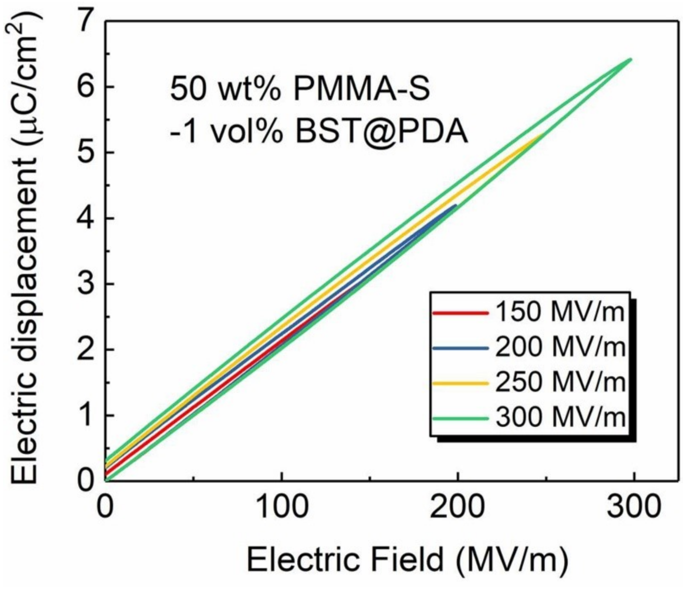

Fig. S22. Unipolar electric displacement–electric fields (*D*–*E*) loops at varied electric fields of 50 wt.% PMMA-S tri-layered composite with 1 vol% BST@PDA plates.

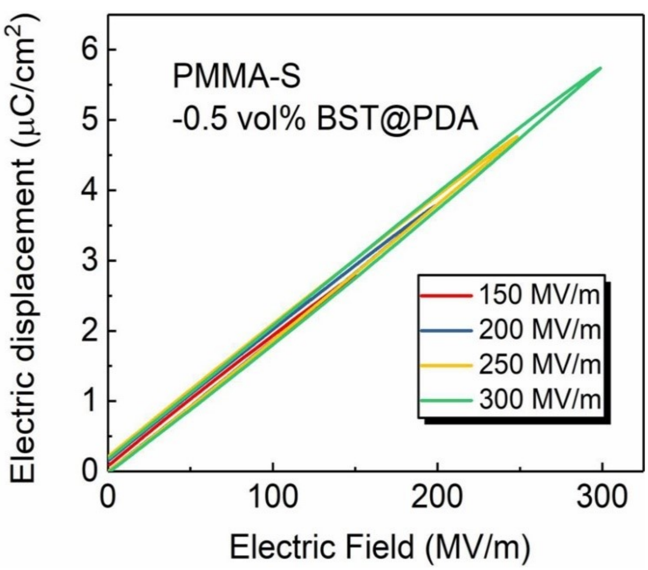

Fig. S23. Unipolar electric displacement–electric fields (*D*–*E*) loops at varied electric fields of PMMA-S tri-layered composite with 0.5 vol% BST@PDA plates.