Supporting Information

Excellent energy density of polymer nanocomposites containing BaTiO$_3$@Al$_2$O$_3$ nanofibers induced by moderation interfacial area

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Fig. S1 (a) Schematic of forming process of core-shell structure BT@Al$_2$O$_3$ nanofibers; (b) SEM image of the as-electrospun fibers.
Fig. S2 The mapping of core-shell structure BT@Al₂O₃ nanofibers.

Fig. S3 (a) FT-IR spectra (b) XPS spectra of BT nfs, BT@Al₂O₃ nfs and BT@Al₂O₃ nfs-DA.

IR absorption peaks appears at 3000-3650 cm⁻¹ (–OH groups and –NH), 2925 cm⁻¹ and 2854 cm⁻¹ (–CH₂), 1626 cm⁻¹ (–NH), 1505 cm⁻¹ (–C–C) and 1254 cm⁻¹ (–C–N), imply that the dopamine have been introduced successfully onto BT@Al₂O₃ nanofibers surface. Two relatively strong peaks at approximately 74.3 and 119.2 eV can be
discovered of the BT@Al₂O₃, corresponding to the Al 2s and Al 2p peaks of Al₂O₃. Compared with BT and BT@Al₂O₃, the peak of N1s is observed BT@Al₂O₃-DA at about 401 eV owing to free –NH₂, affirming the successful introduced of dopamine on the BT@Al₂O₃ nanofibers surface.

Fig. S4 Frequency-dependence of the (a) dielectric constant and (b) dielectric loss tangent of BT@Al₂O₃ nfs/PVDF nanocomposites.

Fig. S5 Frequency-dependence of the (a) dielectric constant and (b) dielectric loss tangent of BT nfs/PVDF nanocomposites.
Fig. S6 The leakage current density of (a) BT nfs/PVDF (b) BT@Al$_2$O$_3$ nfs/PVDF nanocomposites.

Fig. S7 D-E curves of the 5 vol.% BT nfs/PVDF and BT@Al$_2$O$_3$ nfs/PVDF nanocomposites.
Fig. S8 D-E curves of the BT@Al₂O₃ nfs/PVDF nanocomposites loading with different concentration of the fillers.