Supplementary Information

Enhanced dielectric performance of polyvinylidene fluoride composites with all-carbon hybrid architecture: vertically aligned carbon nanotube arrays on graphite nanoplatelets

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Fig. S1 The Schematic Illustration of the Preparation of GCH Particles and GCHs/PVDF Composites.
Fig. S2 The linear fitting to experimental AC conductivity according to Equation 4
Fig. S3  X-ray diffraction patterns of pure PVDF polymer and (a) GCHs/PVDF binary composite: B-4, B-6, and B-10 and (b) GNPs/CNTs/PVDF ternary composite: T-4, T-6 and T-10.
Fig. S4 Origin’s multiple peak separation fitting results of (a) PVDF; GCHs/PVDF binary composite: (b) B-4, (c) B-6, (d) B-10 and GNP/CNTs/PVDF ternary composite: (e) T-4, (f) T-6 and (g) T-10.
Fig. S5 Calculated (a) crystallinity ($X_c\%$) and ($\beta$) relative $\beta$-phase fraction in crystalline ($f$ ($\beta$)) of pure PVDF polymer, GCHs/PVDF binary composite: B-4, B-6, and B-10 and GNP/CNTs/PVDF ternary composite: T-4, T-6 and T-10.