

Supporting Information

Design of heterogeneous sandwich-structured dielectric composites with excellent charge-discharge efficiency and energy storage density

Yue Zhang^{a,b}, Xin He^{a,b}, Sen Li^{a,b}, Yongquan Zhang^{a,b}, Tiandong Zhang^a, Xuan Wang^a, Cai Chen^{*a,c} and Changhai Zhang^{*a,b}

^aKey Laboratory of Engineering Dielectrics and Its Application, Ministry of Education, Harbin University of Science and Technology, Harbin 150080, P. R. China

^bSchool of Electrical and Electronic Engineering, Harbin University of Science and Technology, Harbin 150080, P. R. China

^cSchool of Automation, Harbin University of Science and Technology, Harbin 150080, P. R. China

* Corresponding Authors:

E-mail: chencailee@hrbust.edu.cn; chzhang@hrbust.edu.cn

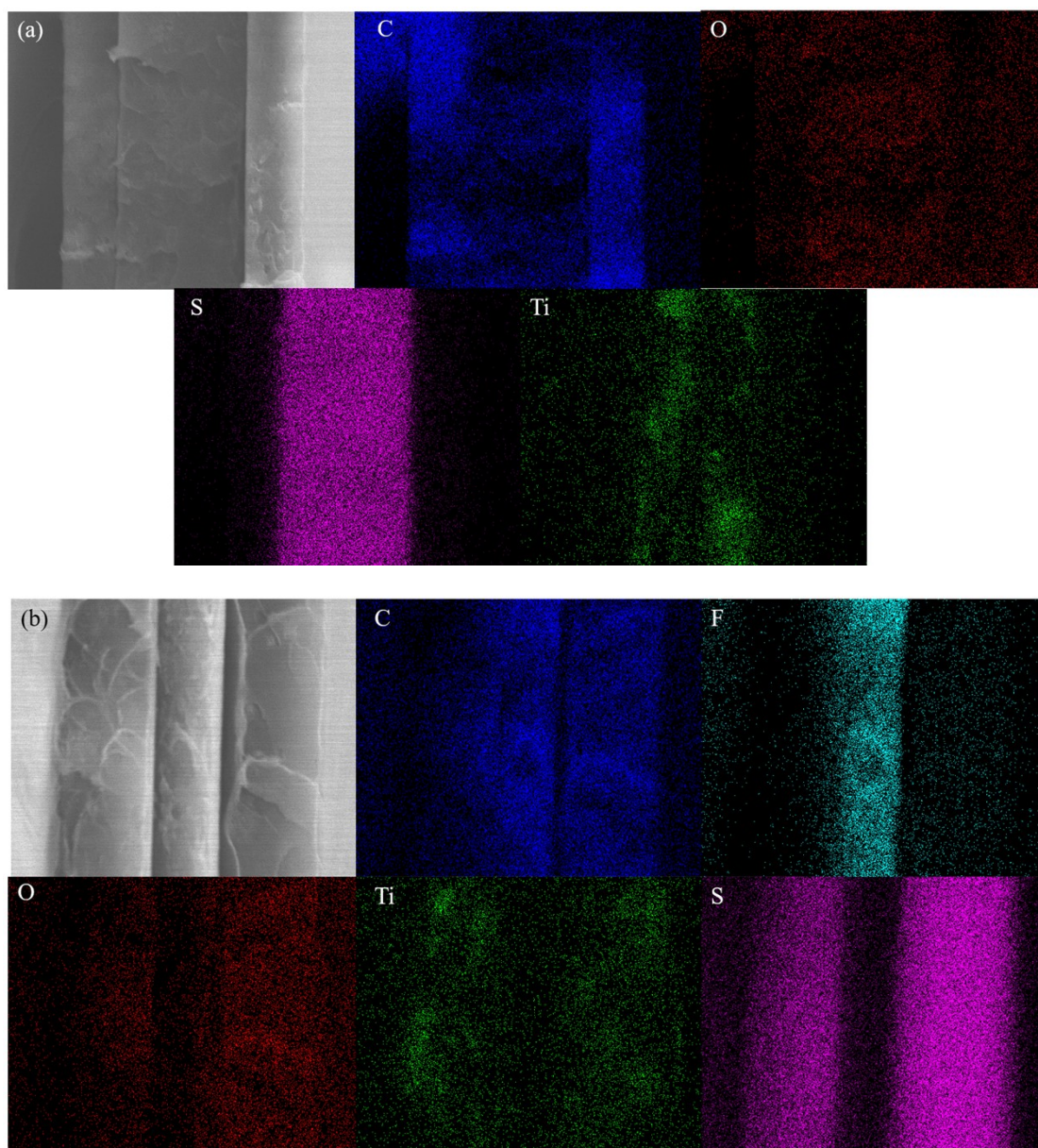


Figure S1. Elemental Mapping for multilayer structure composite dielectrics (a) S/V-T/E-S/V (b) T/E-S/V-T/E.

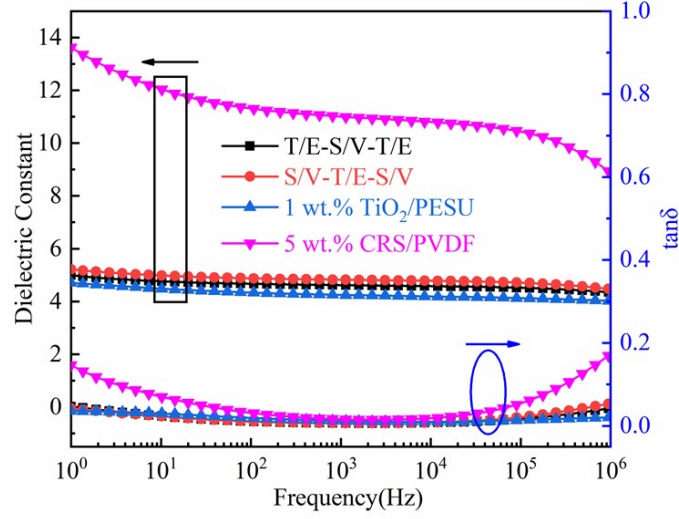


Figure S2. Frequency dependent image of dielectric constant and $\tan\delta$ of composite film at room temperature.

Table S1. Crystallinity and Melting Temperature of Sandwich Composite Dielectrics.

	Crystallinity	$\Delta H_m(\text{J/g})$	Melting Temperature($^{\circ}\text{C}$)
5 wt.% CRS/PVDF	39.71%	43.78	165.80
S/V-T/E-S/V	12.89%	13.50	164.26
T/E-S/V-T/E	4.99%	5.23	163.82

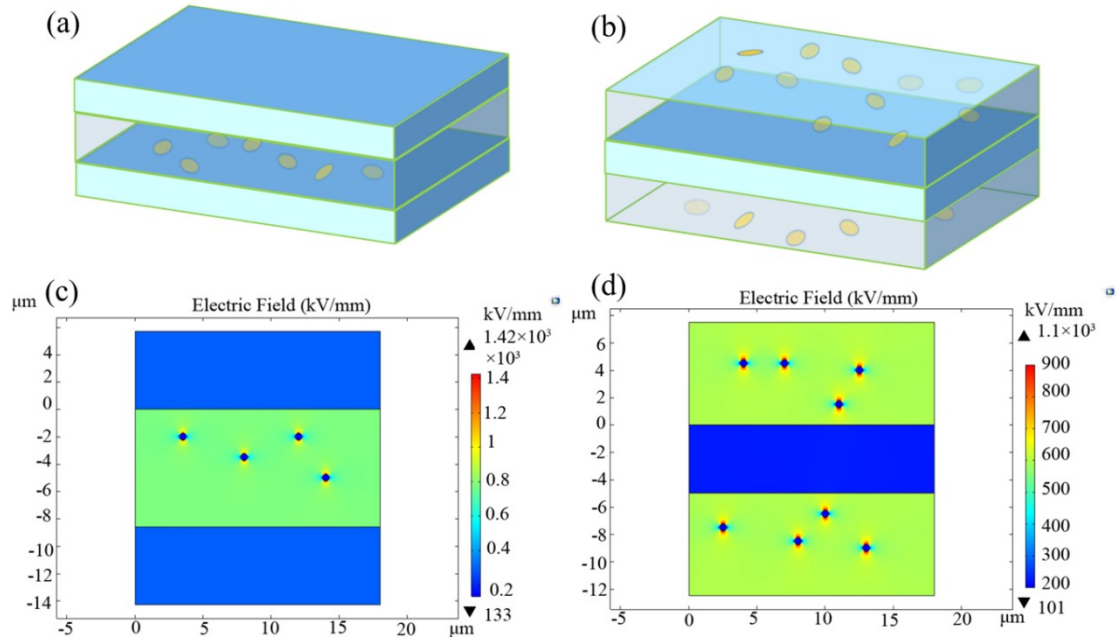


Figure S3. Heterogeneous sandwich structure composite dielectric (a) S/V-T/E-S/V (b) T/E-S/V-T/E. Simulation diagram of the internal and external electric field distribution of sandwich composite dielectrics (c) S/V-T/E-S/V (d) T/E-S/V-T/E.