Achieving Exceptional Energy Storage Performance in PbHfO$_3$ Antiferroelectric Ceramics through Defect Engineering Design

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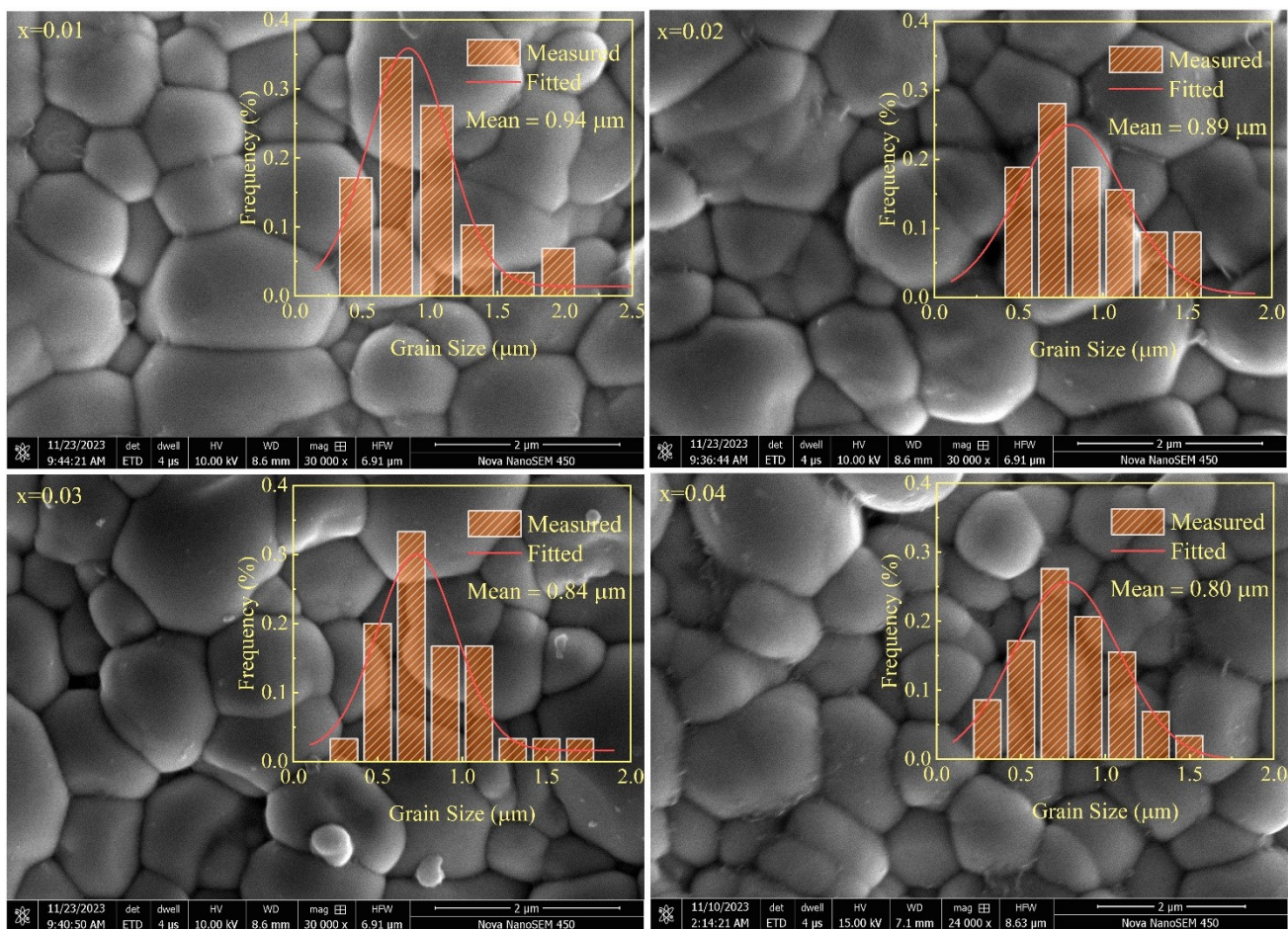
[d]*School of Materials Science and Engineering, Jingdezhen Ceramic University, Jingdezhen 333403, E-mail: zengtao0626@126.com (T. Zeng)*
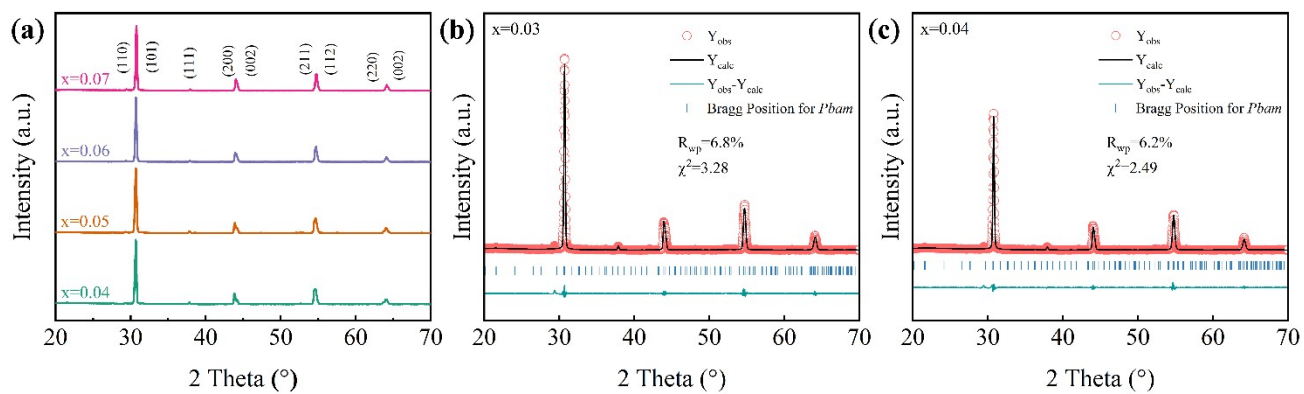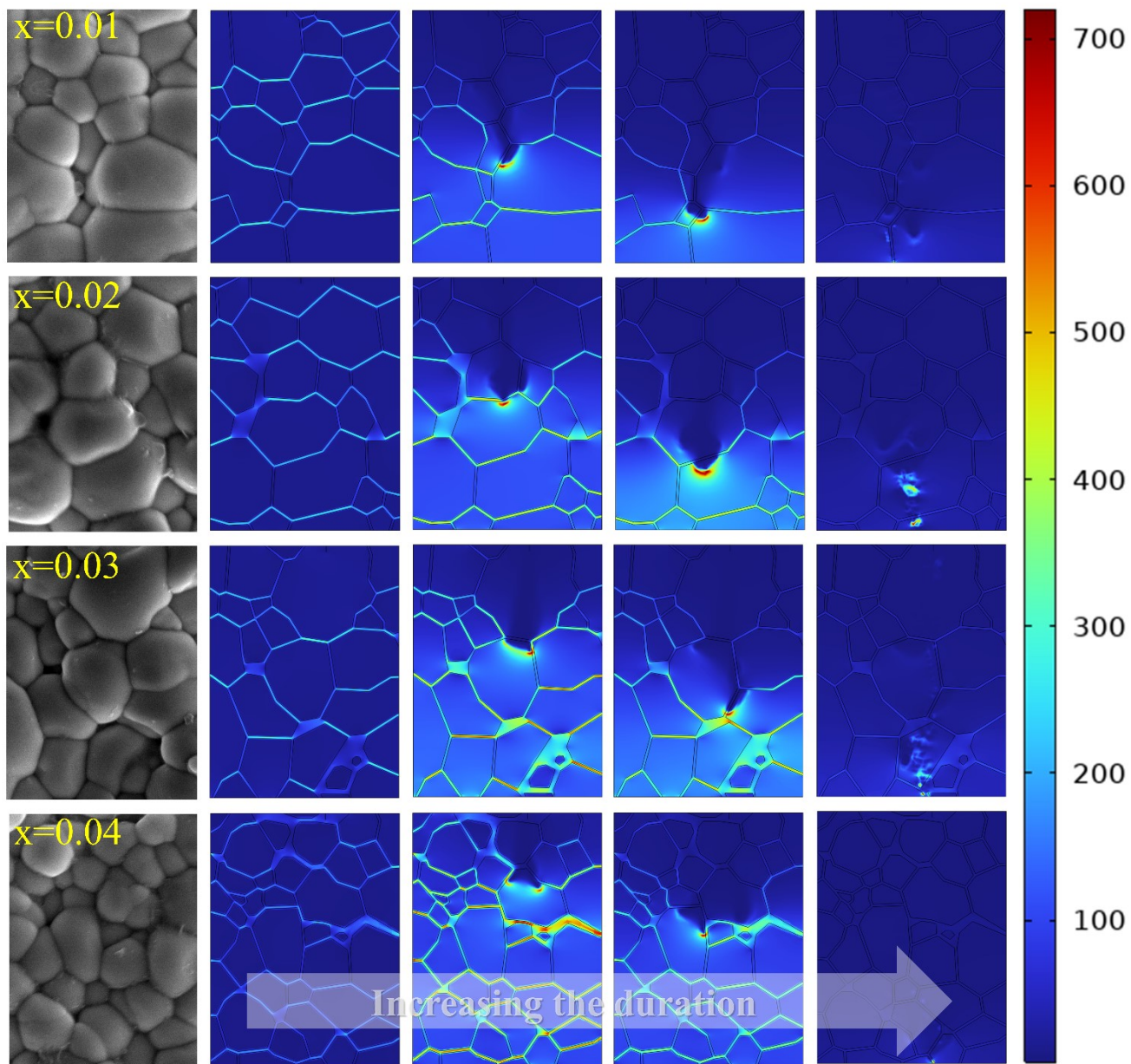
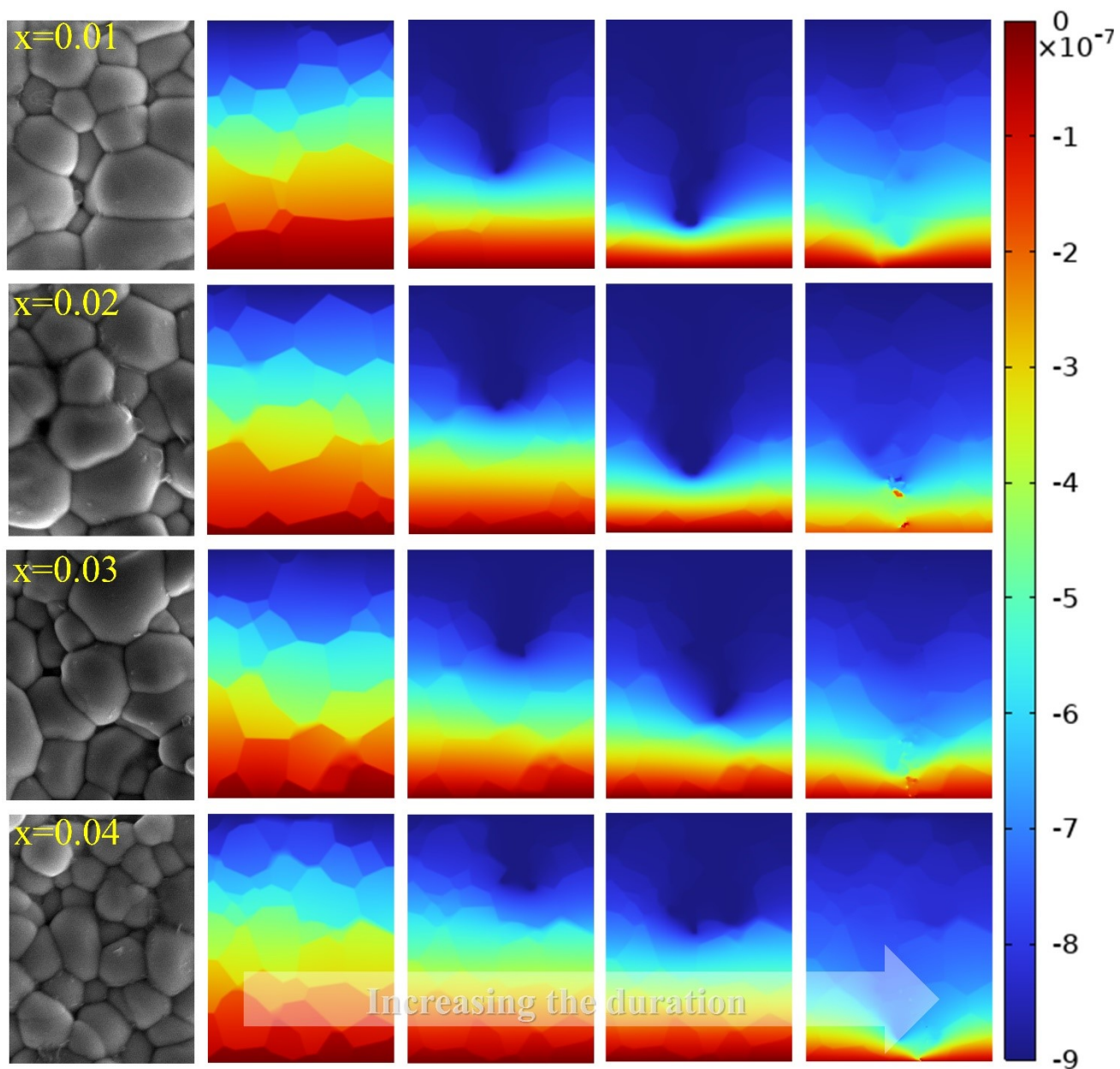**Fig. S1** (a) XRD patterns of PSLHST ceramics. (b)-(c) XRD refinement of PLHST3 and PLHST4 ceramics.
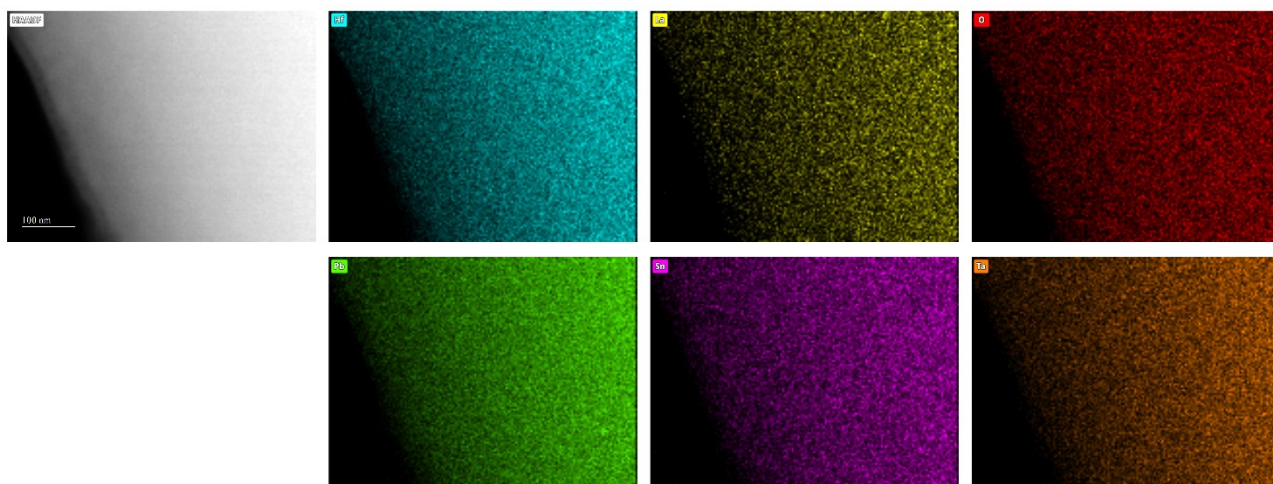
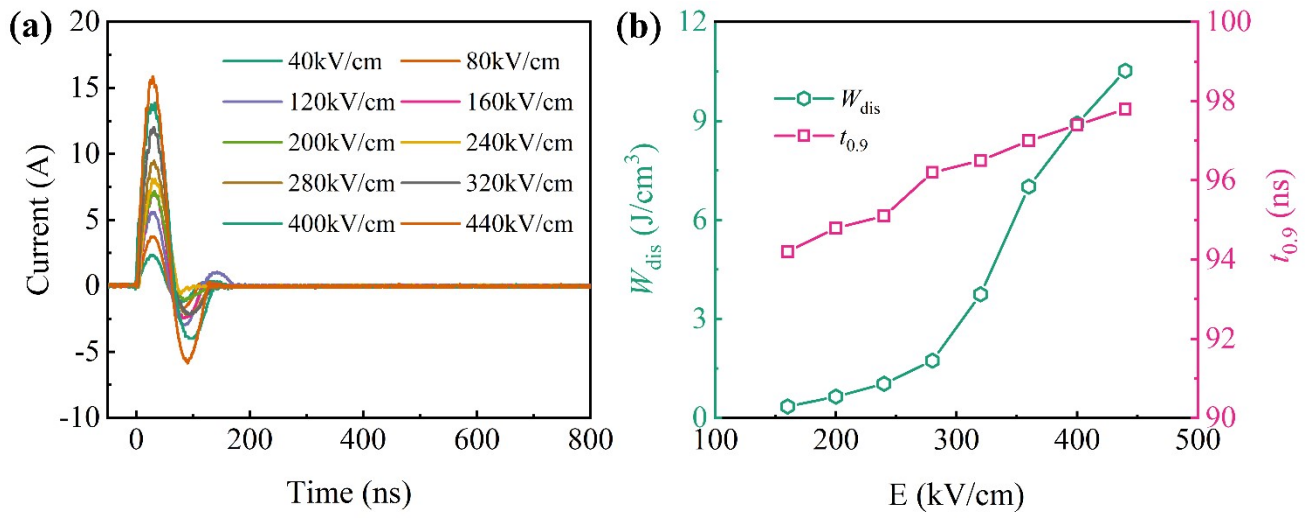**Fig. S2** TEM images and corresponding EDS energy spectra of PLHST2 ceramics.

Fig. S3 SEM image and corresponding grain size distributions of PLHST ceramics.

Fig. S4 Electric field evolution with time in PLHST ceramics.

Fig. S5 Electric potential evolution with time in PLHST ceramics.

Fig. S6 (a) Underdamped discharge curves of the PLHST2 ceramic. (b) $t_{0.9}$ and W_{dis} as functions of the electric field.

Table S1 Refined lattice parameters and other agreement factors.

Composition	Space group	R_{wp} (%)	χ^2 (%)	Volume (Å³)	Lattice parameters (Å)	
x=0.01	Pbam	7.3	3.65	554.465	a	5.81715
					b	11.66059
					c	8.17416
x=0.02	Pbam	6.6	3.03	554.025	a	5.81783
					b	11.64778
					c	8.1757
x=0.03	Pbam	6.8	3.28	553.697	a	5.8066
					b	11.62389
					c	8.17387
x=0.04	Pbam	6.2	2.49	552.097	a	5.81445
					b	11.6072
					c	8.18048