

Supplementary Information for
Superior energy storage performance of BiFeO₃-BaTiO₃-CaHfO₃
lead-free ceramics

Jianwei Zhao^{*a}, Hongtian Li^a, Yuxiao Du^a, Xiaoxin Chen^a, Hailan Qin^a, Jinming Wang^a, Tingnan
Yan^a, Shuhui Yu^a, Yongming Hu^{*b}, Dawei Wang^{*c}

^aShenzhen Institute of Advanced Electronic Materials, Shenzhen Institute of Advanced Technology,
Chinese Academy of Sciences, Shenzhen, 518055, China

^bHubei Key Laboratory of Ferro & Piezoelectric Materials and Devices, Hubei University, Wuhan,
430062, China.

^cSchool of Instrumentation Science and Engineering, Harbin Institute of Technology, Harbin, 150080,
China

* Corresponding authors: jw.zhao@siat.ac.cn; huym@hubu.edu.cn; wangdawei102@gmail.com

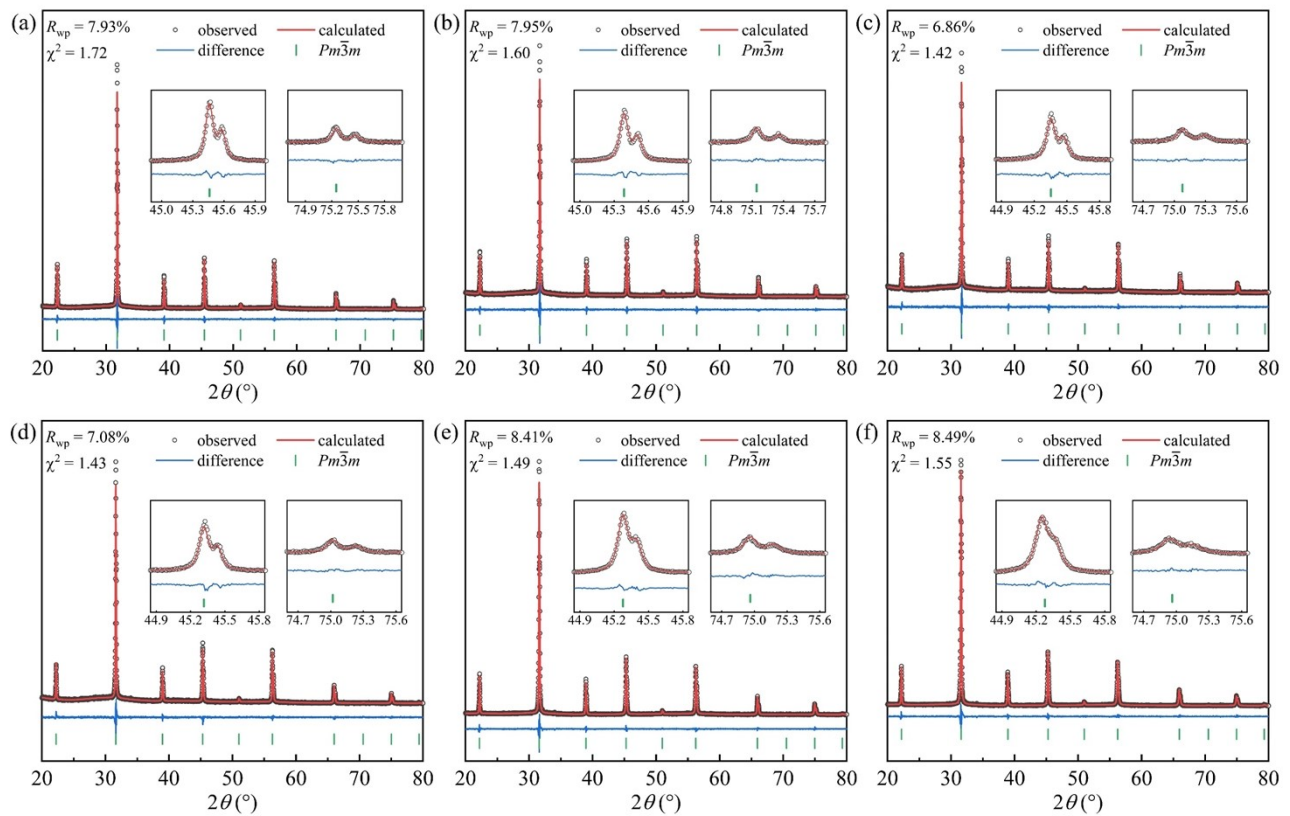


Figure S1 Rietveld refinement results for the BF-*x*BT-CH lead-free ceramics with the composition of *x* = (a) 0.25, (b) 0.30, (c) 0.35, (d) 0.40, (e) 0.45, and (f) 0.50.

Table S1 Rietveld refinement summary for the BF-*x*BT-CH lead-free ceramics.

<i>x</i>	<i>a</i> (Å)	ρ (g cm ⁻³)	<i>R</i> _{wp} (%)	χ^2
0.25	3.9870	7.523	7.93	1.72
0.30	3.9931	7.398	7.95	1.60
0.35	3.9960	7.279	6.86	1.42
0.40	3.9989	7.162	7.08	1.43
0.45	4.0022	7.049	8.41	1.49
0.50	4.0048	6.947	8.49	1.55

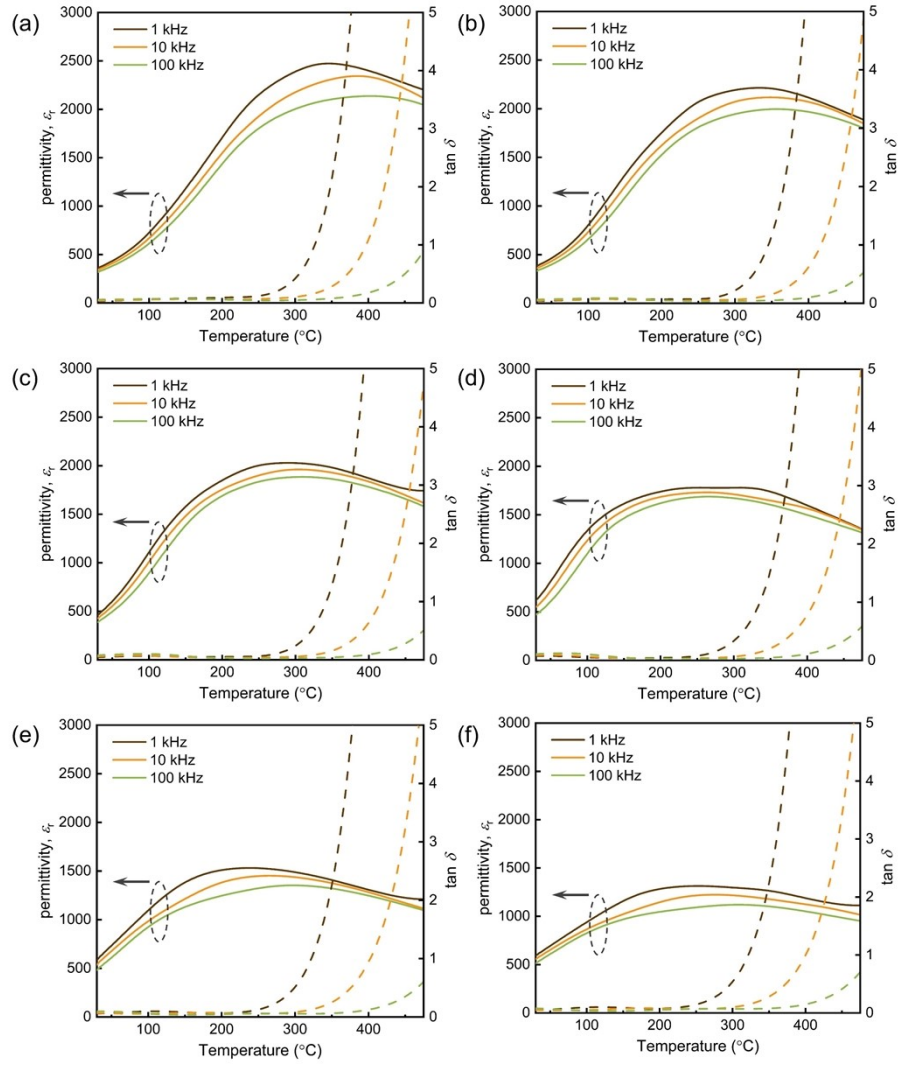


Figure S2 Frequency- and temperature-dependent ϵ_r and $\tan \delta$ for the BF- x BT-CH lead-free ceramics with the composition of $x =$ (a) 0.25, (b) 0.30, (c) 0.35, (d) 0.40, (e) 0.45, and (f) 0.50.

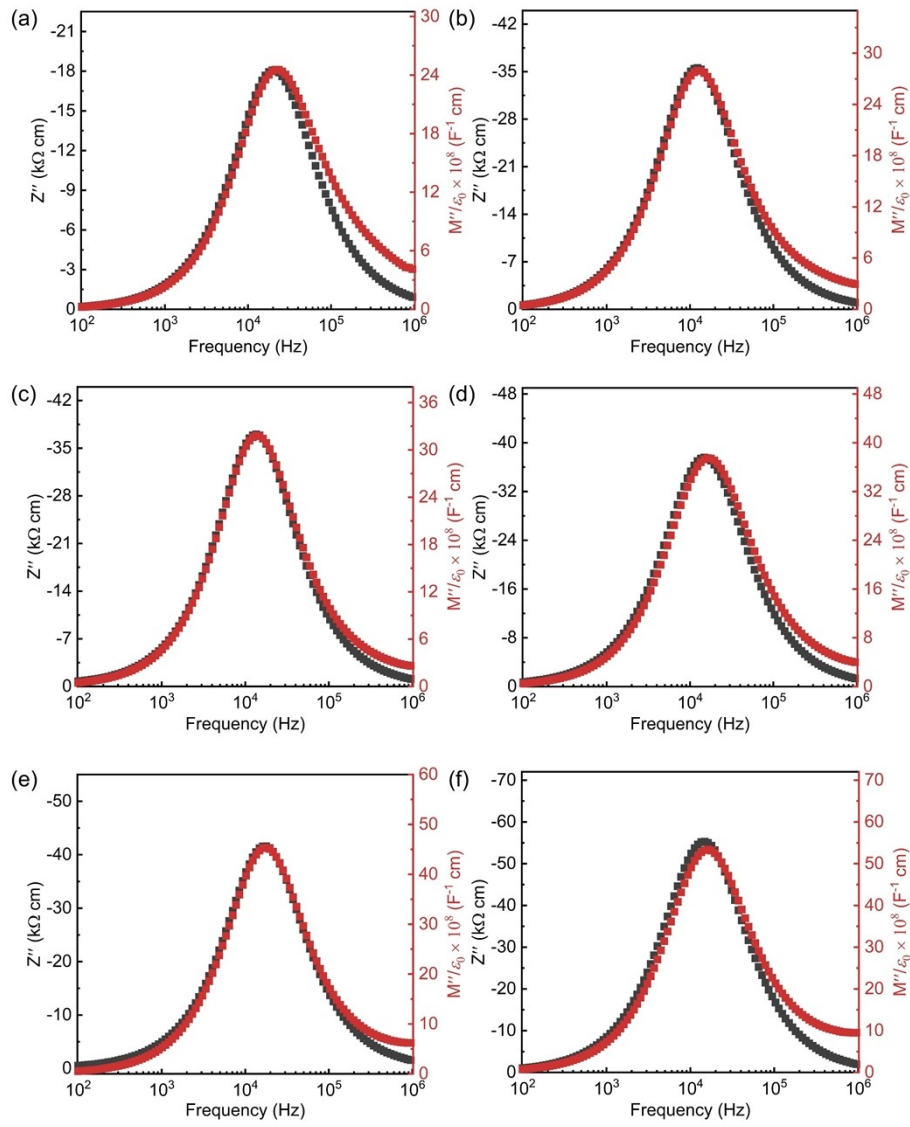


Figure S3 Composition-dependent Z'' and M'' spectroscopic plots for the BF- x BT-CH lead-free ceramics with the composition of $x =$ (a) 0.25, (b) 0.30, (c) 0.35, (d) 0.40, (e) 0.45, and (f) 0.50 at 425°C.

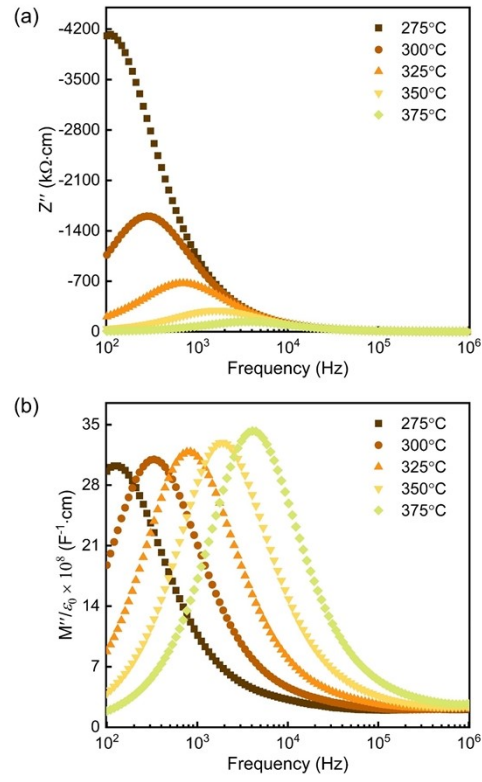


Figure S4 Temperature-dependent (a) Z'' plots and (b) M'' plots for the representative 0.50BF-0.40BT-0.10CH ceramic.