Supplementary material for

Enhanced recoverable energy storage density and efficiency in $(1\text{-}x)Ba_{0.85}Ca_{0.15}Zr_{0.1}Ti_{0.9}O_3$-$x$$SrTiO_3$-$MnO_2$ lead-free ceramics

Wenjin Yang,[a] Fengzhen Huang,[*,a] LiHuai Shu,[a] YuLong Yang,[a] Baolian Gong,[a] Xiaomei Lu,[**,a] and Jinsong Zhu[a]

[a.]National Laboratory of Solid State Microstructures and Physics School, Nanjing University, Nanjing 210093, China

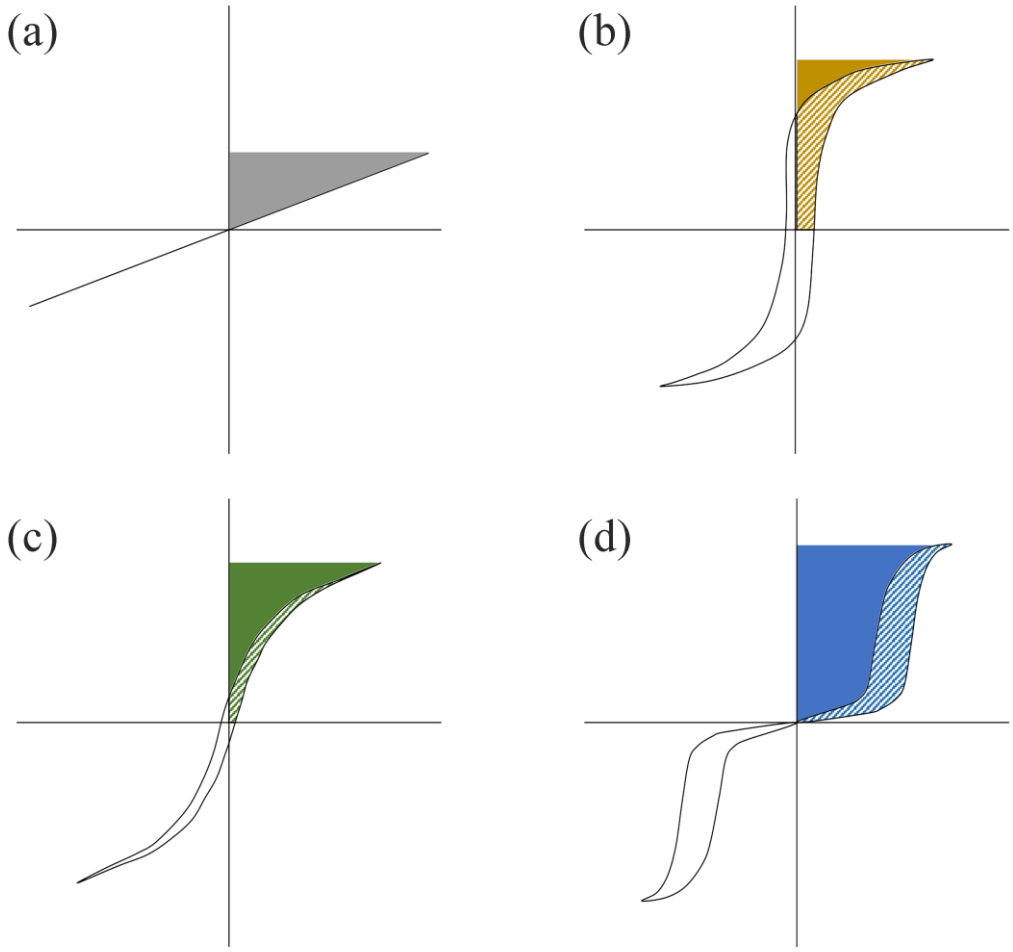

Figure S1 Schematic illustrations of hysteresis loops of: (a) linear dielectrics, (b) ferroelectrics, (c) relaxor ferroelectrics and (d) antiferroelectrics. The shaded areas and slash areas represent the recoverable energy density and dissipated energy density, respectively.

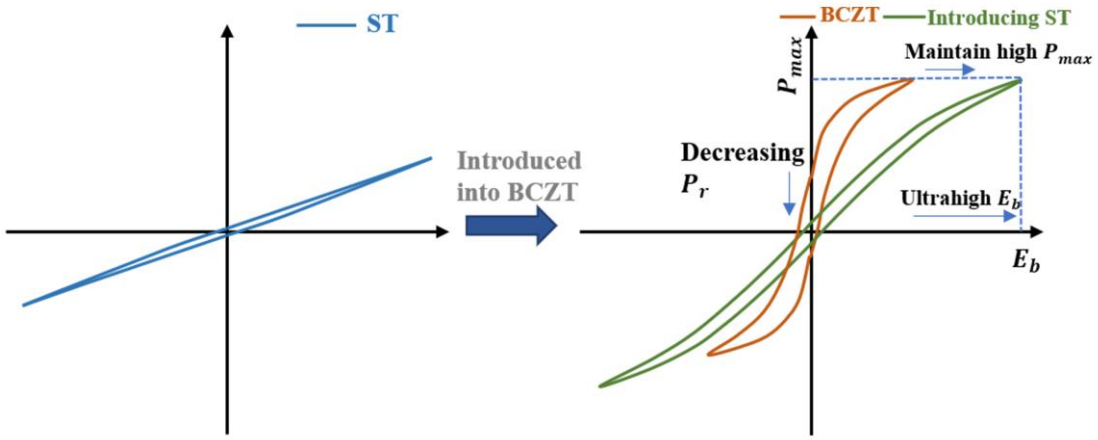

Figure S2 Scheme of the excellent energy storage performance obtained by constructing solid solution of BCZT and ST.

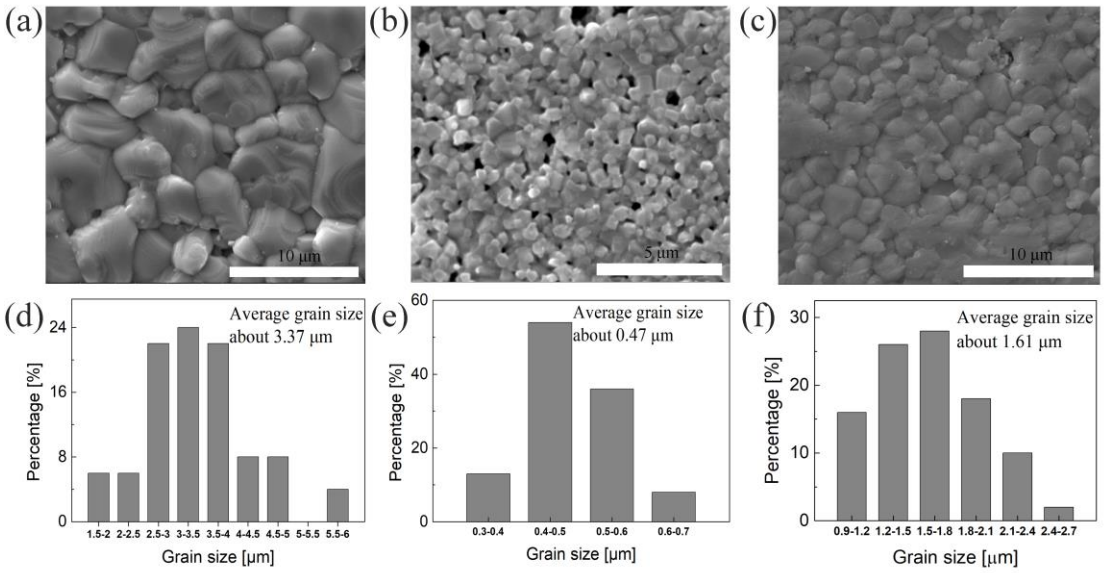

Figure S3 SEM images and the grain size distribution of (a) and (d) pure BCZT ceramics, (b) and (e) 0.4BCZT-0.6ST ceramics sintered at 1200 ℃, (c) and (f) 0.4BCZT-0.6ST ceramics sintered with a two-step sintering method, where 3 mol% MnO_2 is added as sintering aid.