Electronic Supplementary Information

## Excellent energy storage properties and superior stability achieved in

## lead-free ceramics via spatial sandwich structure design strategy

Fei Yan, Xia He, Hairui Bai, Bo Shen, Jiwei Zhai\*

Shanghai Key Laboratory for R&D and Application of Metallic Functional Materials, Functional

Materials Research Laboratory, School of Materials Science and Engineering, Tongji University,

Shanghai 201804, China

\*Corresponding author: Jiwei Zhai. E-mail address: apzhai@tongji.edu.cn



Figure S1(a) A picture of the prepared tape casting slurry; Images of the prepared (b) tape casting

thick films and (c) ceramic samples



Figure S2 Schematic diagram of the charging-discharging measurement



Figure S3 SEM images and grain size distributions for the thermally etched surface of (a, c)

BNTSNA and (b, d) BNBT ceramics



Figure S4 XRD patterns of the BNTSNA and BNBT ceramics



Figure S5 Polarization of  $P_{max}$ ,  $P_r$  and  $P_{max} - P_r$  as a function of the electric field for (a)  $S_1$  and (b)

 $S_2$ 



Figure S6 Current versus electric field (I-E) curves for (a)  $S_1$  and (b)  $S_2$  under different electric fields



Figure S7(a) Time dependent discharge current under different electric fields for S2, (b) Discharging



energy density  $(W_d)$  and discharging time  $(t_{0.9})$  as a function of electric field for  $S_2$ 

Figure S8 Polarization of  $P_{max}$ ,  $P_r$  and  $P_{max} - P_r$  as a function of (a) frequency, (b) cycle numbers,

and (c) temperature for  $S_2$