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## **Supplementary**

## Ultra-high piezoelectric properties and labyrinthine-domain structure in (K, Na)(Ta, Nb)O<sub>3</sub>

## with phase boundary

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Figure S1. (a) (b) (c) The height, amplitude and phase of out-plane PFM patterns using DART PFM mode for

0 μm 5 0 μm 0 μm 10 15 0 27.6 (b) (a) (c)600 E 20.0 5 300 a 200 - 500 400 - 500 300 - 600 5 5 250 15.0 getrac 10 10 10 Height] 100 8 200 15 0.0

KNTN41 sample, respectively.

Figure S2. (a) (b) (c) The height, amplitude and phase of out-plane PFM patterns using DART PFM mode for



KNTN34 sample, respectively.

Figure S3. (a) (b) (c) The height, amplitude and phase of out-plane PFM patterns using DART PFM mode for



KNTN28 sample, respectively.

Figure S4. (a) (b) (c) The height, amplitude and phase of out-plane PFM patterns of KNTN41 sample after poling under 7.5V for a certain 2  $\mu$ m region, respectively.

