Supplementary information to: Elasticity Modulation due to Polarization Reversal and Ionic Motion in the Ferroelectric Superionic Conductor $KTiOPO_4$

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Figure S1 shows the selectivity of K and TiO as a function of the milling depth, calculated as the concentration of each element at the $P_{s\uparrow}$ domains as a fraction of the concentration at the $P_{s\downarrow}$ domains at the same milling depth. For the K, the results show a gradually declining selectivity as expected for screening charges. The selectivity extends through the full 28 nm probed in good agreement with previous estimates of the screening depth[1]. Because of the much lower strength of the TiO signal, the selectivity is in this case of the same order of magnitude as the noise and thus gives no indication about the screening depth.

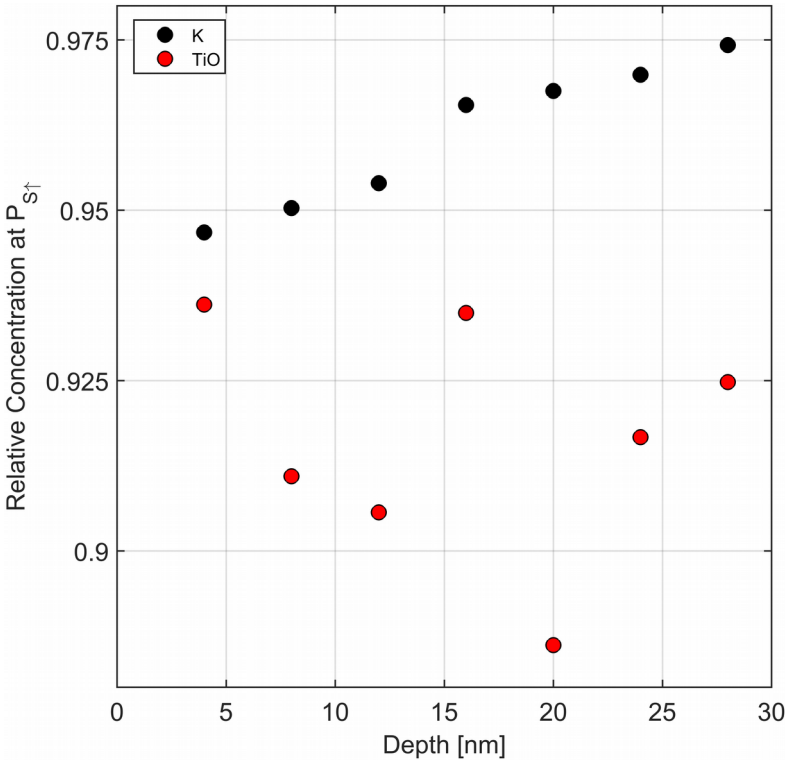

Figure S1: Relative concentration of K (black) and TiO (red) at the $P_{s\uparrow}$ domains as a function of milling-depth

The PFM spectroscopy analysis was conducted through the open source pycroscopy package[2].

1 Shvebelman, M. M.; Agronin, A. G.; Urenski, R. P.; Rosenwaks, Y.; Rosenman, G. I. Kelvin Probe Force Microscopy of Periodic Ferroelectric Domain Structure in $KTiOPO_4$ Crystals. *Nano Lett.* **2002** 2, 455.
2 Somnath, Suhas, Chris R. Smith, Nouamane Laanait, and Stephen Jesse. Pycroscopy. Computer software. Vers. 0.60.0. Oak Ridge National Laboratory, 01 June 2016. Web. <https://pycroscopy.github.io/pycroscopy/about.html>.