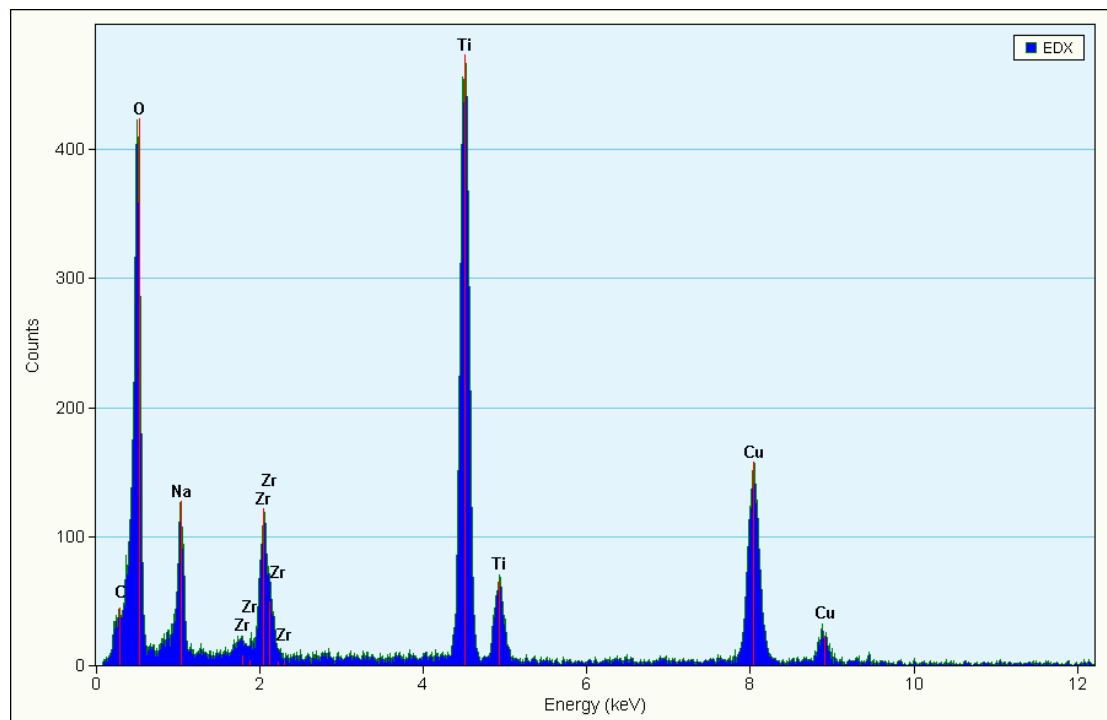


Figure S1 (a) TEM-EDS_of nanoleaf in microsisal_

(b) Electron energy-loss spectroscopy (EELS) of nanoleaf_

(a)



(b)

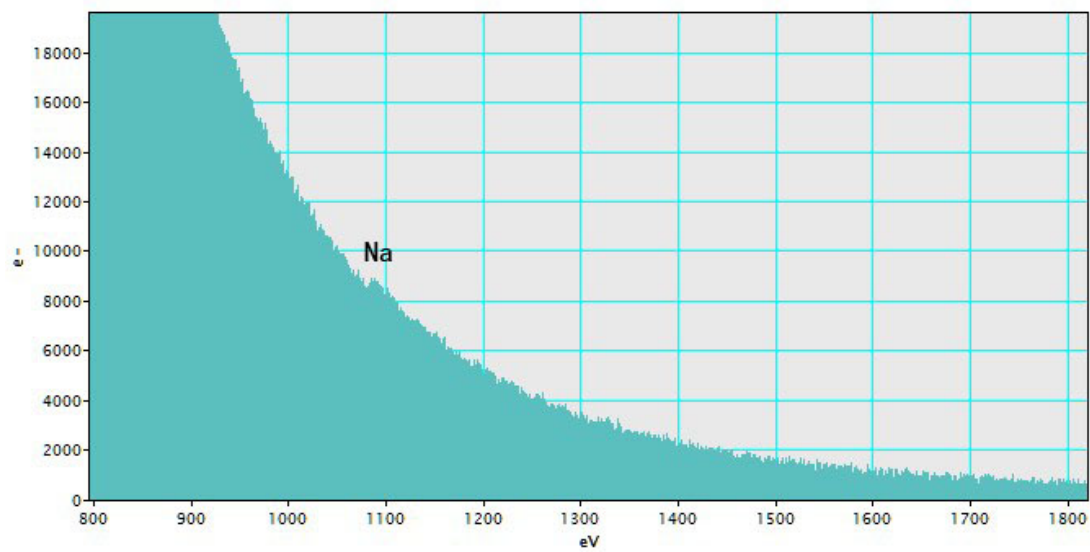
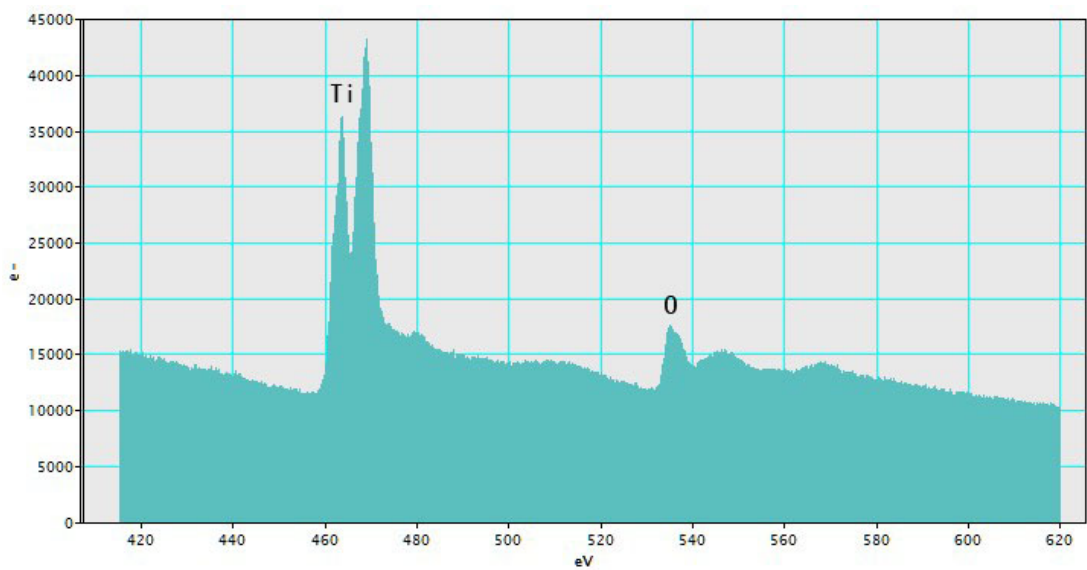


Figure S2 Fourier transforms and fitting of Zr K-edge EXAFS in R space (experiment data: red open circle; fitting data: black solid line).

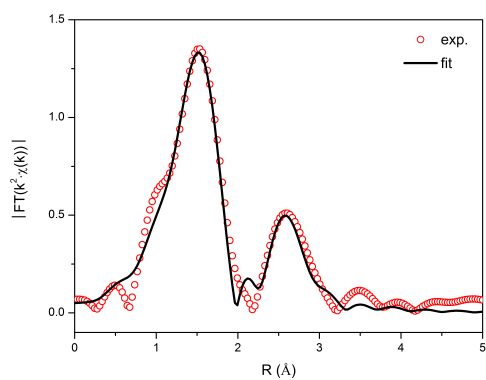


Figure S3 Fourier transforms and fitting of Ti K-edge EXAFS in R space (experiment data: red open circle; fitting data: black solid line).

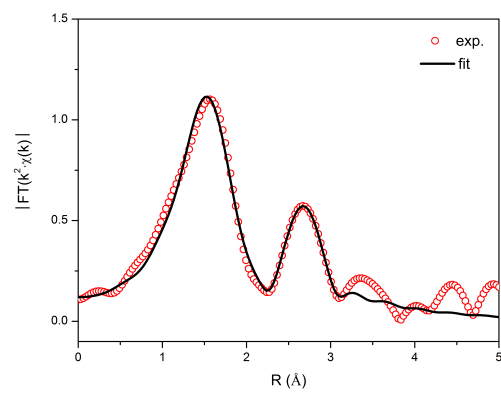


Figure S4 Cross-sectional view of the $\text{Na}_2(\text{Ti}_{0.8}\text{Zr}_{0.2})_4\text{O}_9$ microspiral attached to the BMG substrate.

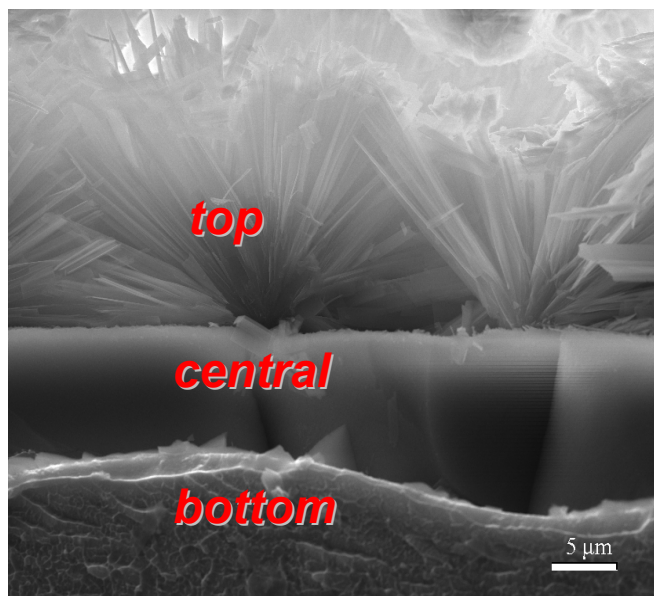


Figure S5 The ferroelectric hysteresis loop for the $\text{Na}_2(\text{Ti}_{0.8}\text{Zr}_{0.2})_4\text{O}_9$ microsisal.

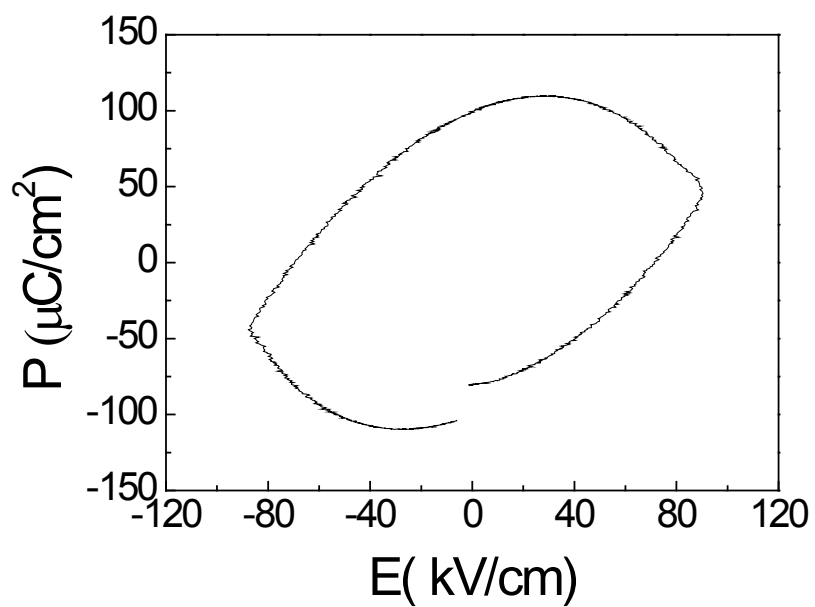


Figure S6 Relative permittivity versus temperature plots at 100 kHz for the $\text{Na}_2(\text{Ti}_{0.8}\text{Zr}_{0.2})_4\text{O}_9$ microsilal.

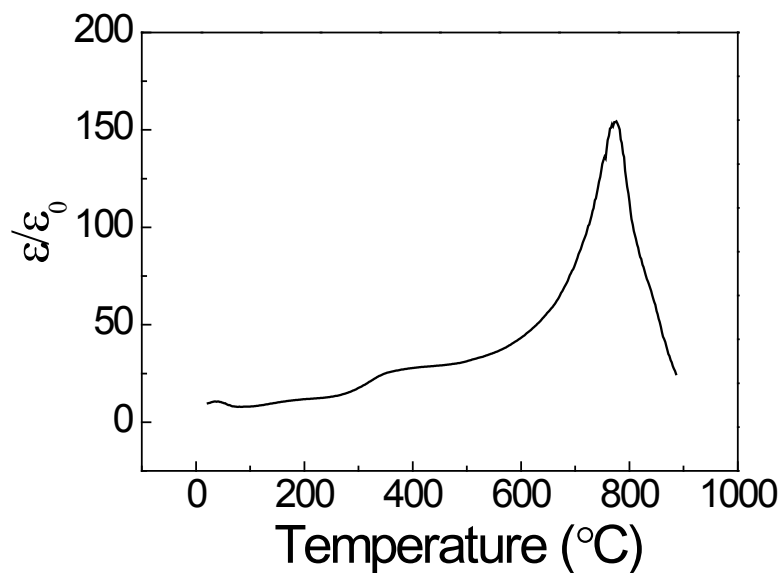


Table S1 Zr, Ti K edge EXAFS coordination parameters of Na₂(Ti_{0.75}Zr_{0.25})₄O₉ nanoleafs

	Shell	N	R (Å)	σ² (10⁻³ Å²)	ΔE₀ (eV)
Nanoleaf-Zr	Zr-O	5.8±1.1	2.12±0.02	7.9±1.8	-4.5±1.3
	Zr-Ti	2.6±0.6	3.26±0.02	6.7±1.2	-4.6±0.8
	Shell	N	R (Å)	σ² (10⁻³ Å²)	ΔE₀ (eV)
Nanoleaf-Ti	Ti-O	4.2±0.7	1.95±0.01	11.9±0.1	9.9±0.7
	Ti-Ti	4.6±0.4	3.07±0.01	14.9±1.1	1.8±1.2
	Ti-Zr	1.1±0.1	3.23±0.02	17.4±1.0	6.9±3.1

Table S2 The ICP results for water solution (10^{-5} M) at different duration times.

Element	1h	4h	8h	15h
Be	8.145	22.053	53.274	180.808
Zr	7.122	15.95	22.024	21.344
Ti	1.074	0.357	0.677	0.094
Ni	none	none	none	none
Cu	none	none	none	none

Table S3 The EDS results at different sites along the cross-section of the microsilal attached BMG sample. Top, central and bottom correspond to the microsilal, transition layer and BMG substrate, respectively, in Fig. S4.

Element	Top / at%	Central / at%	Bottom / at%
OK	64.99	70.08	
NaK	15.79	14.88	
ZrL	04.21	0.20	33.70
TiK	15.02	6.79	51.13
NiK		1.92	03.36
CuK		6.13	11.81