Supplementary Materials

Influence of Oxygen Pressure on the Domain Dynamics and Local Electrical Properties of $BiFe_{0.95}Mn_{0.05}O_3$ Thin Films Studied by Piezoresponse Force Microscopy and Conductive Atomic Force Microscopy

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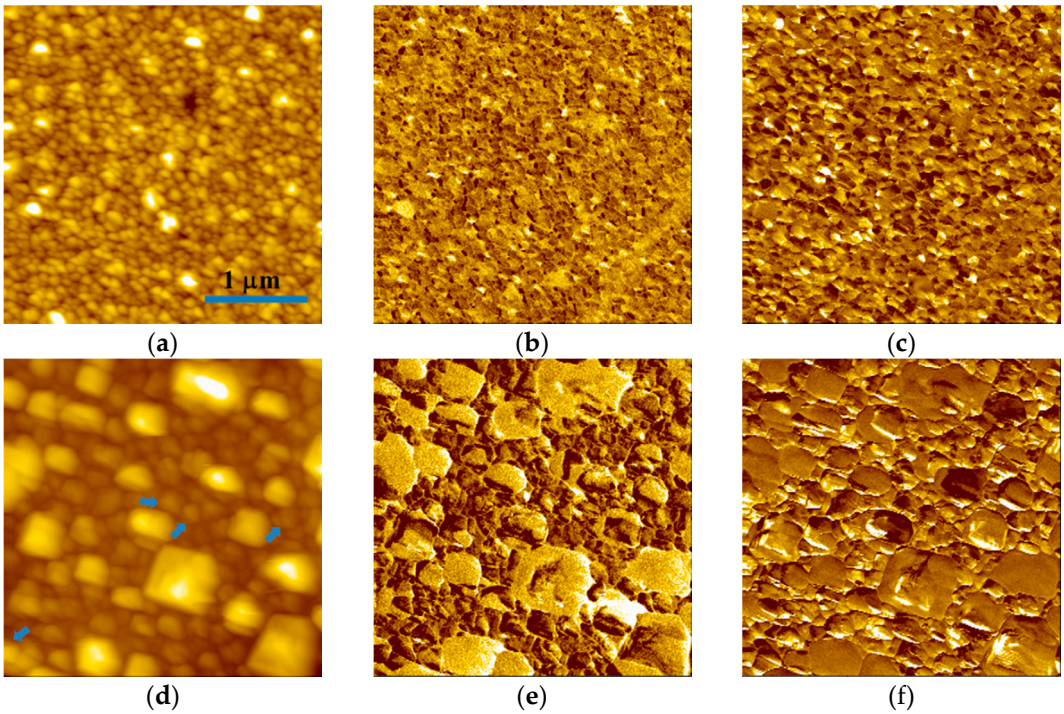

Figure S1. The topography image (**a**,**d**) of BFMO films with the deposition oxygen pressure 2 Pa and 10 Pa respectively, the corresponding out-of-plane PFM image (**b**,**e**) and the in-plane image (**c**,**f**).

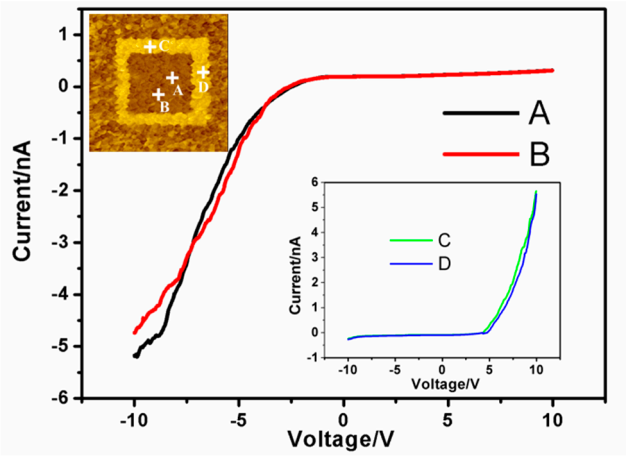

Figure S2. The I–V curves (c, f) of BFMO films deposited at P_{O_2} = 2 Pa. The insert shows the position of point A, B, C, and D.

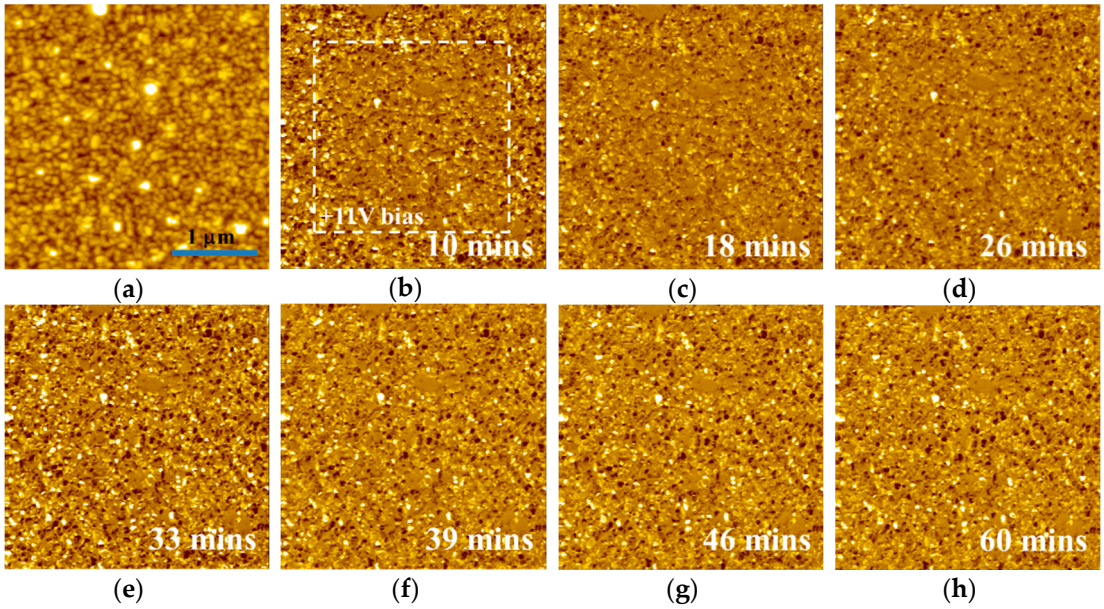

Figure S3. The topography image (**a**) of BFMO film with the deposition oxygen pressure P_{O_2} = 2 Pa. The corresponding in-plane piezoresponse phase image (**b–h**) after depolarized with +11 V voltage with the tip earthed at different times.

Table S1. The average size of all backswitched domains in the poled area in Figure 4.

Time (sec)	Average Domain Size (nm)
1080	3.2
1560	27.1
1980	59.5
2340	72.9
2760	82.0
3180	90.1
3600	93.2
4200	96.2
4600	96.6
5000	96.8