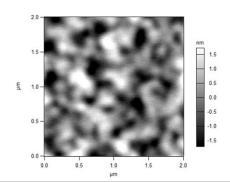
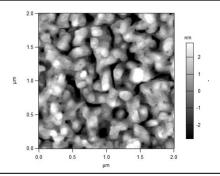
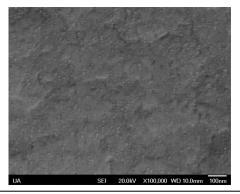
## **Supporting Information**



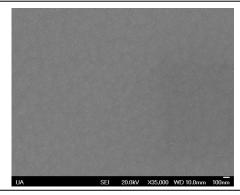
AFM image of stoichiometric BiFeO<sub>3</sub> film on STO, RMS roughness = 850 pm



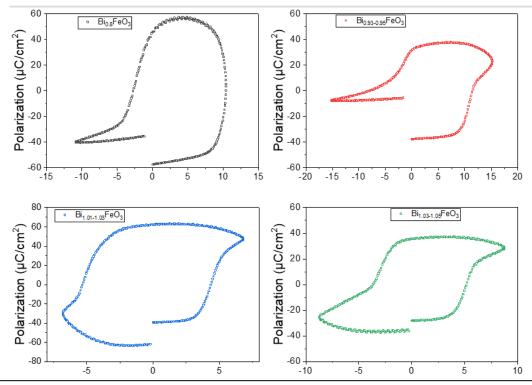
AFM image of slightly Bi-rich (4-5%) BiFeO $_3$  film on SRO | STO, RMS roughness = 1.4 nm



Corresponding SEM image of the film



Corresponding SEM image of the film



Ferroelectric hysteresis loops for BiFeO3 films of different compositions measured at 25 kHz