Supporting Information

Multiferroic Bi_2FeCrO_6 based p-i-n Heterojunction Photovoltaic devices

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Table S1 PLD deposition parameters of BFCO thin films

Devices	BFCO absorber	Substrate Temp. (ºC)	Repetition rate (Hz)
#1 (*i*−*n*) ITO/BFCO/NSTO	BFCO #1	610	8
#2 (*i*−*n*) ITO/BFCO/NSTO	BFCO #2	680	4
#3 (*p*−*i*−*n*) ITO/NiO/BFCO/NSTO	BFCO #3	610	8
#4 (*p*−*i*−*n*) ITO/NiO/BFCO/NSTO	BFCO #4	680	4

Table S2 Main structural parameters obtained for the different BFCO films

Sample of BFCO	Ordered domain	Disordered domain
	a (Å) / c (Å) / V (Å^3)	a (Å) / c (Å) / V (Å^3)
BFCO #1	3.911 / 3.976 / 60.82	3.906 / 3.958 / 60.66
BFCO #2	3.919 / 3.970 / 60.97	3.911 / 3.949 / 60.73

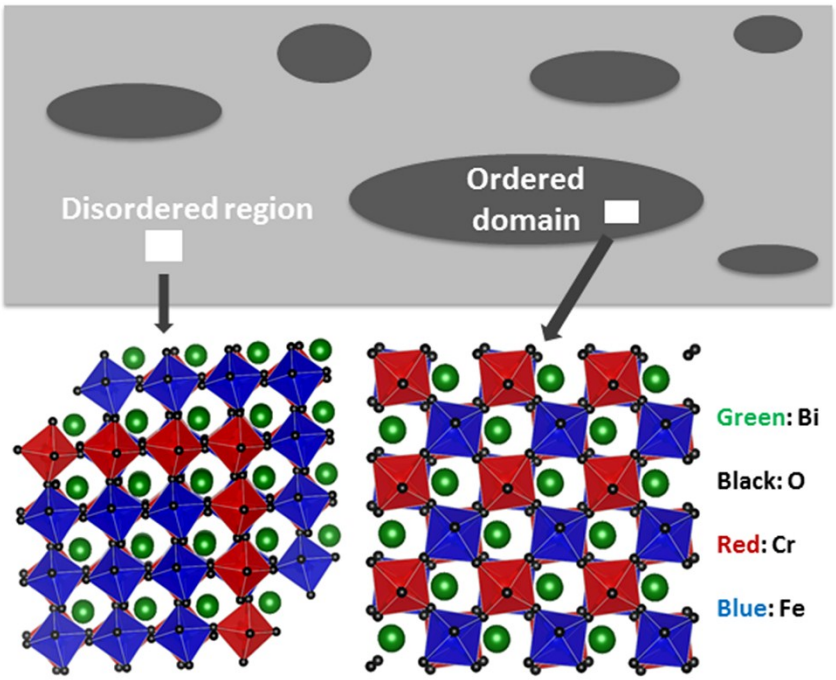

Fig. S1 Schematic representation of the ordered domain in the disordered region of BFCO, and corresponding representation of FeO_6/CrO_6 arrangements in disordered and ordered domain of the double perovskite BFCO.

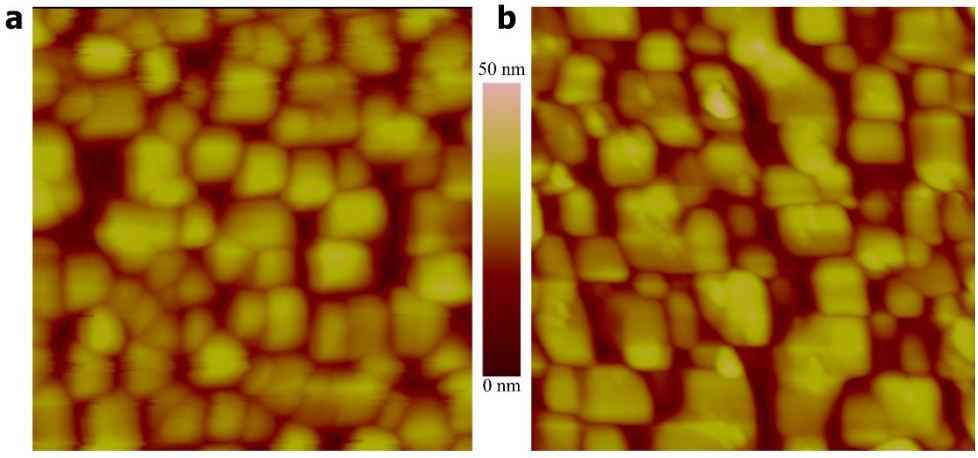

Fig. S2 (a) 2 × 2 μm^2 AFM image for 120 nm-thick BFCO #1 and (b) BFCO #2, the root mean square roughness is *ca.* 6 nm.

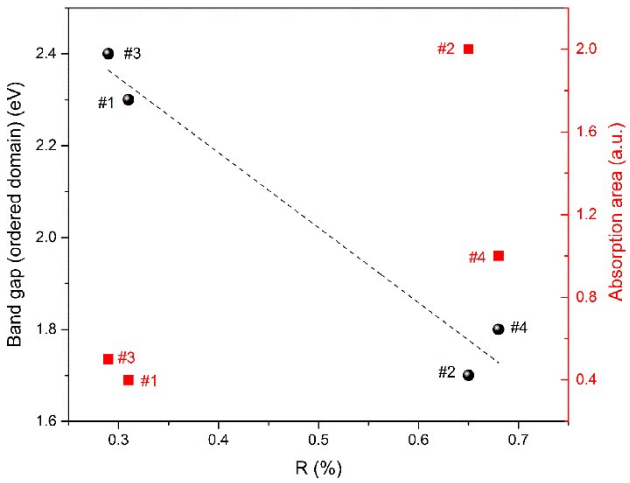

Fig. S3 Bandgap threshold (o-BFCO) and corresponding absorption area versus R in BFCO films (#1 − #4) grown using different PLD parameters.

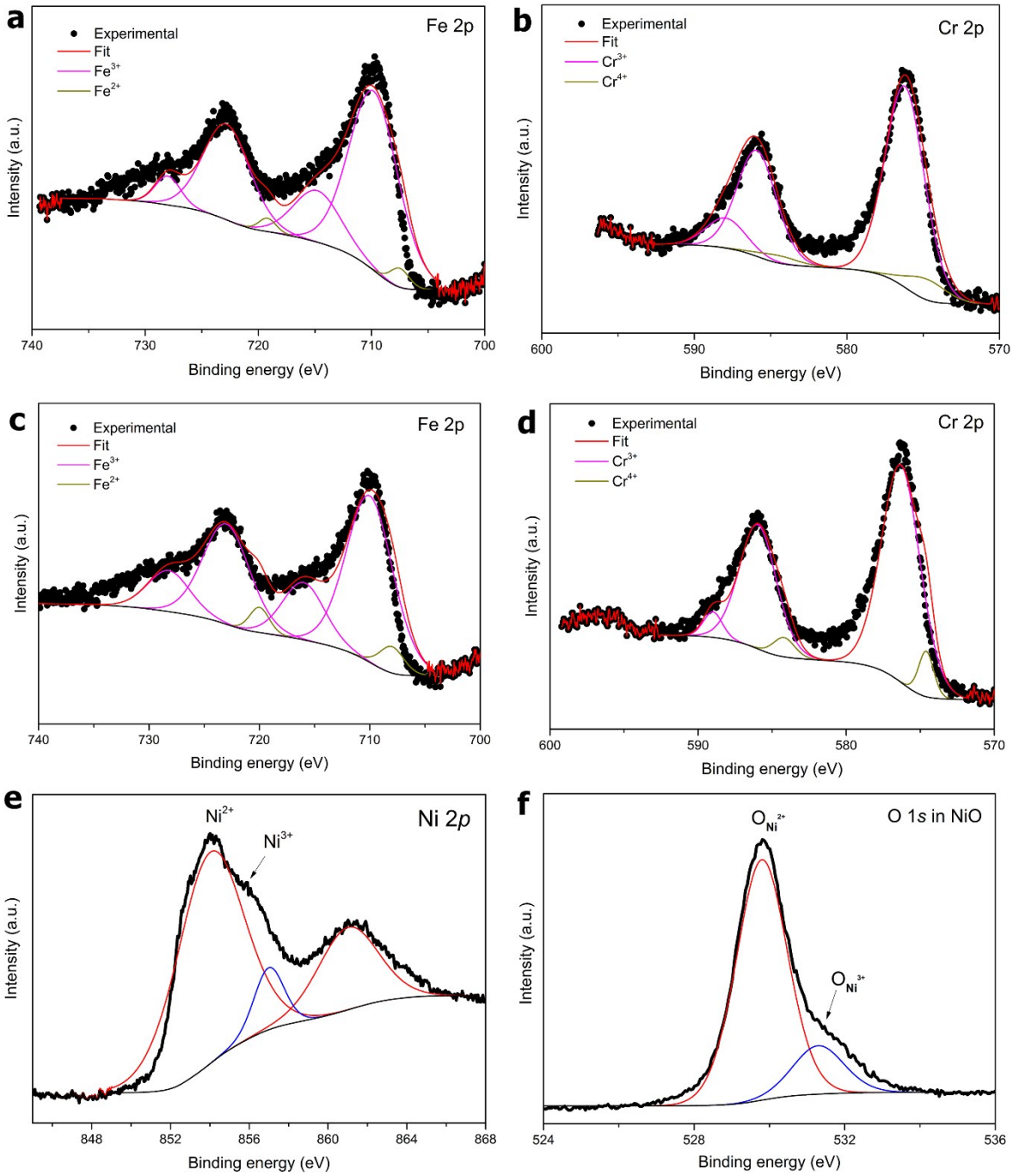

Fig. S4 High resolution XPS spectra of (a) Fe 2p (b) Cr 2p in BFCO #1; (c) Fe 2p and (d) Cr 2p in BFCO #2. (e) Ni 2p and (f) O 1s in NiO.

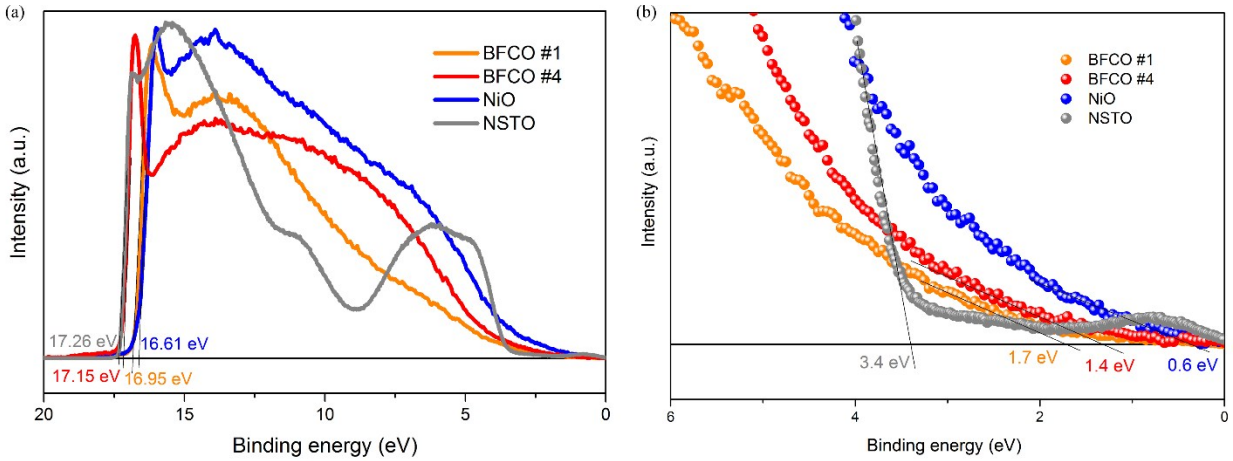

Fig. S5 (a) Representative UPS measurements of NiO, BFCO #1, BFCO #4 and NSTO; (b) the detailed UPS valence band structure of films between 0 eV to 6 eV.