

Figure S1 The SEM images sintered at  $1200 \sim 1300^{\circ}$ C for 3h of the BFZTO samples with x=0, 0.2 0.4



**Figure S2** The Rietveld refinement of XRD patterns sintered at 1200~1300°C for 3 h of the BFZTO samples with x=0, 0.2, 0.4



**Figure S3** The XPS spectra of Fe 2p and O 1s of the BZTFO samples with x=0, 0.2, 0.4 sintered at 1200~1300°C for 3 h



Figure S4 The hysteresis loops of the BZTFO samples with x=0, 0.2, 0.4 sintered at  $1200 \sim 1300^{\circ}$ C for 3 h



Figure S5 Frequency-dependent curves of permittivity in 18~40 GHz of the BFZTO samples sintered at 1200~1300°C for 3 h



Figure S6 Frequency-dependent curves of permeability in 18~40 GHz of the BFZTO samples sintered at 1200~1300°C for 3 h



**Figure S7** The reflection loss versus frequency and thickness of the BFZTO with x=0.2 and 0.4 sintered at 1200~1300°C for 3 h