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Electronic supplementary information for

In Situ Tuning Crystallization Pathways by Electron Beam Irradiation and Heating in Amorphous Bismuth Ferrite Films

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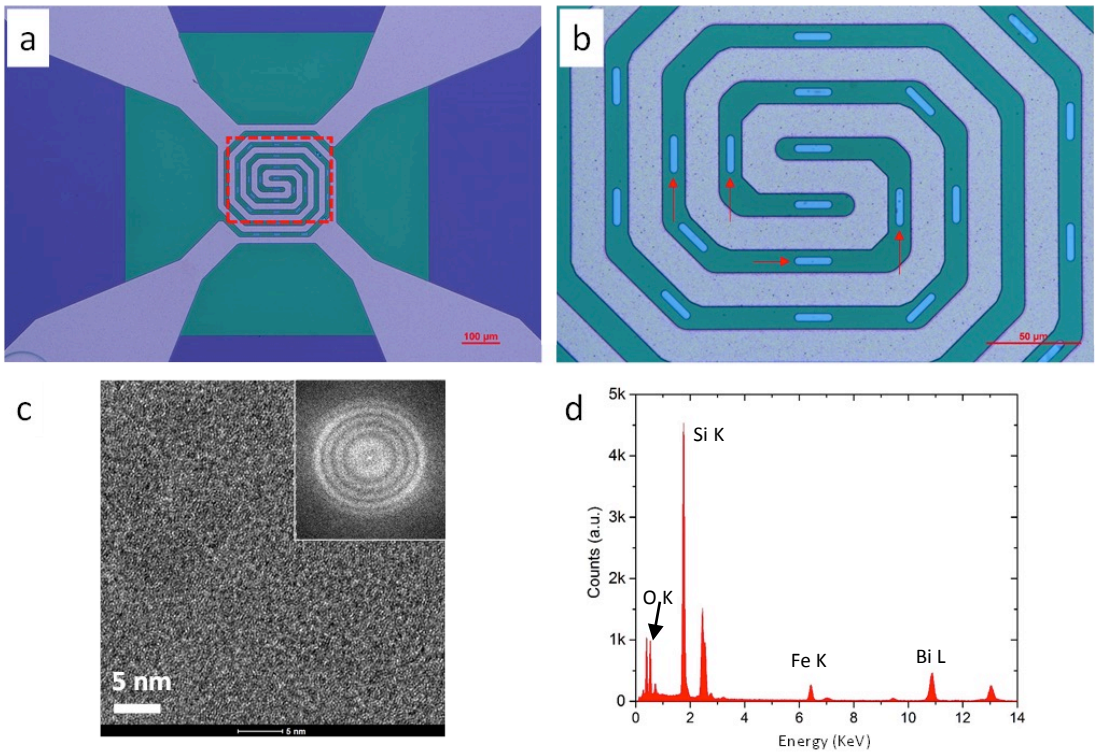

Figure S1. (a) The configuration of the TEM heating chips used in this study. (b) The enlarged view of the red squared region in (a). The red arrows indicate the electron transparent area for TEM observation. (c) TEM image and FFT pattern (inset) of the deposited film. (d) EDX spectrum of the deposited film. Fe is deficient (the atomic ratio of Bi and Fe is 3.8:1) according to our quantitative EDS analysis.

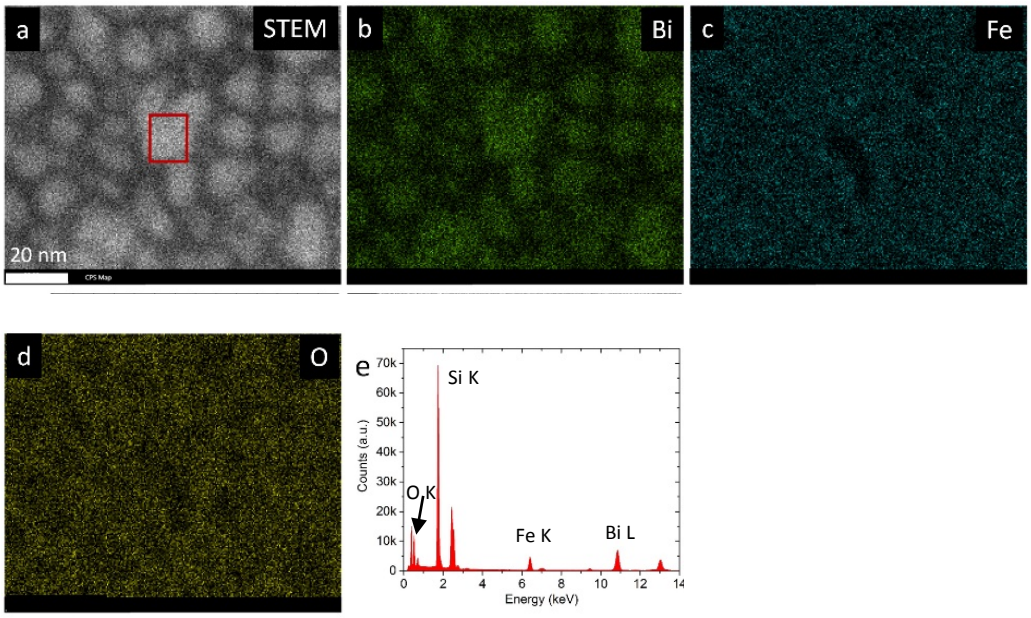

Figure S2. The EDX element mapping of bismuth ferrite thin film after electron beam radiation for 15 min (electron dose rate: 2.6×10^3 e/(Å^2 s)). (a) High angle annular dark field (HAADF)-STEM image, (b) Bi, (c) Fe and (d) O elemental maps. (e) EDX spectrum of the whole image area in (a).

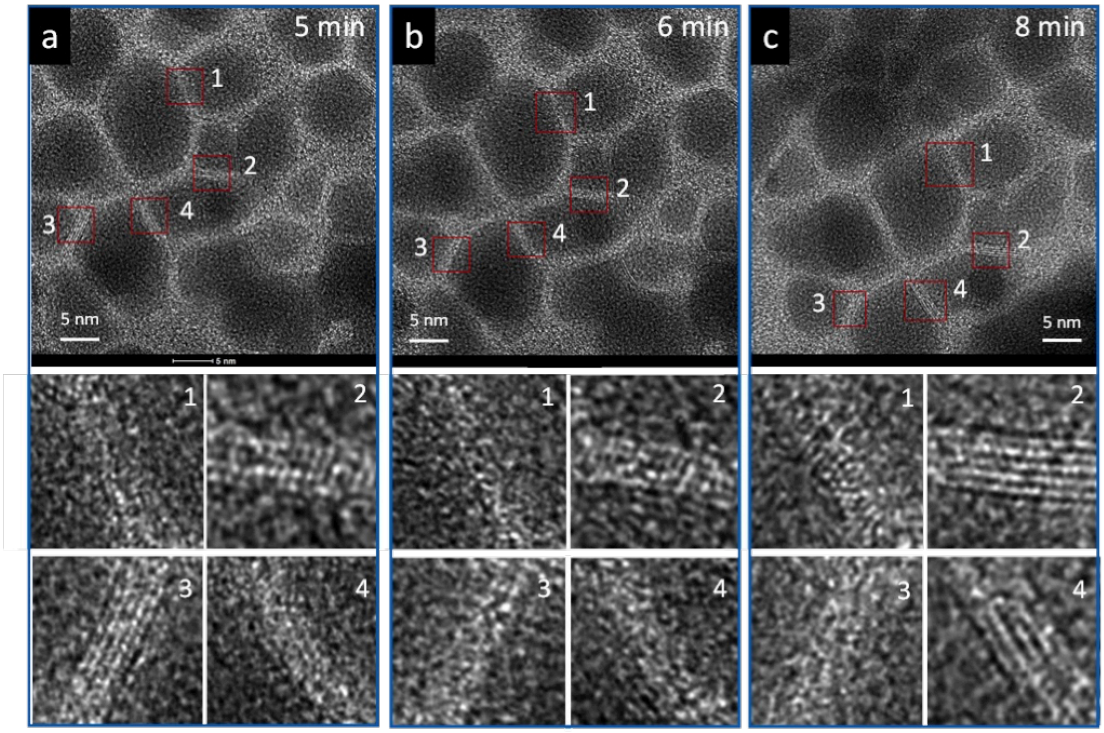

Figure S3. Time sequential HRTEM images of the same area under electron beam radiation at temperature of 300 ^{o}C. Several regions as marked by 1,2,3,4 are selected to track the microstructural evolution. The region 1 and 4 gradually transform from amorphous to crystalline state, the crystal orientation of region 2 rotates, while region 3 transforms from crystalline to amorphous state.