

Supporting information

Microstructure and Properties of Well-Ordered Multiferroic

Pb(Zr,Ti)O₃/CoFe₂O₄ Nanocomposites

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Supplementary Figure 1

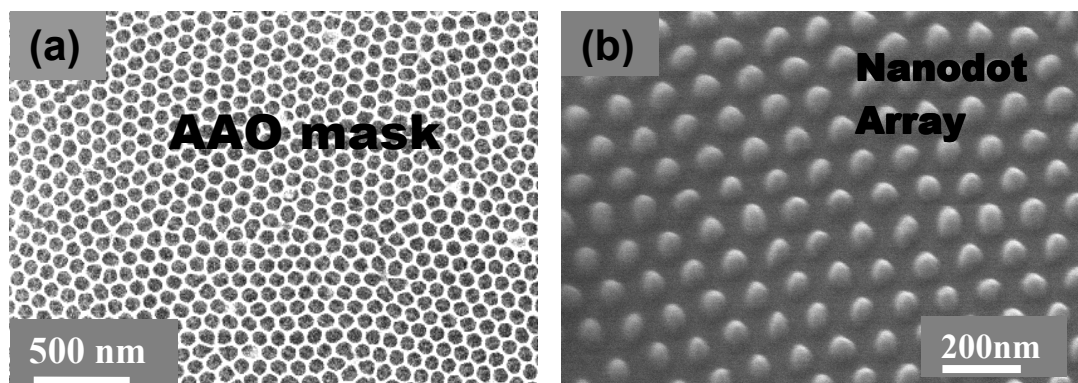


Figure S1. (b) SEM images of the AAO mask used; (c) SEM image of the CFO nanodot array

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Supplementary Figure 2

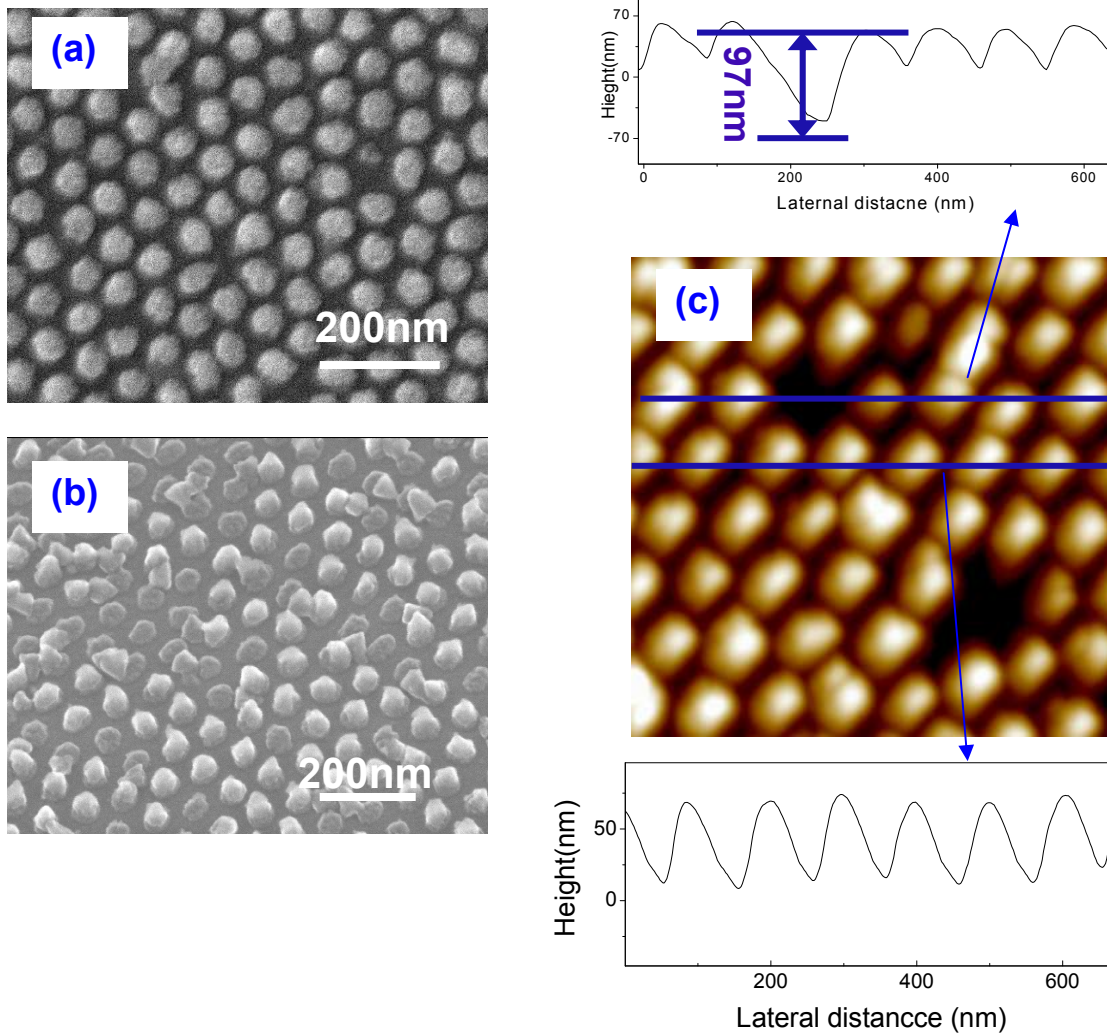


Figure S2. SEM images of the CFO/PZT bilayered nanodots. (a) Top view and (b) image taken by tilting the sample by 60° which shows a cone-like CFO capping layer on top; some of the dots were broken during the mask removing process. (c) AFM image and two depth profiles for the nanodot array. The dots are regular but the measured dot height of 40 nm using the regular array is not accurate as the tip cannot reach the bottom (lower curve). However, if a dot is occasionally detached from the substrate, the tip can reach the bottom and the real height of the dots of around 100 nm is obtained (upper curve).

Supplementary Figure 3

(a)

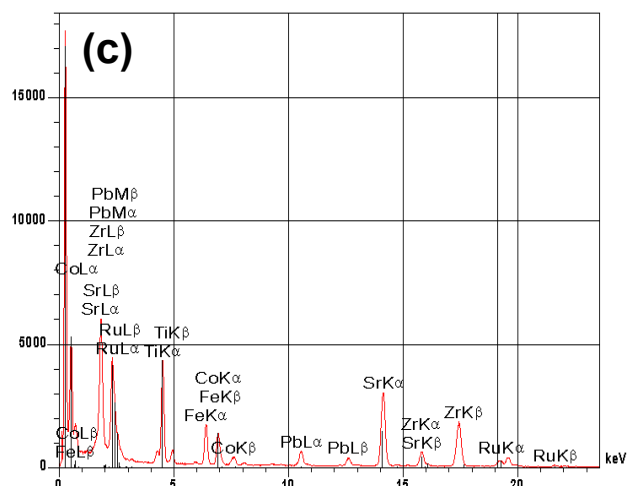
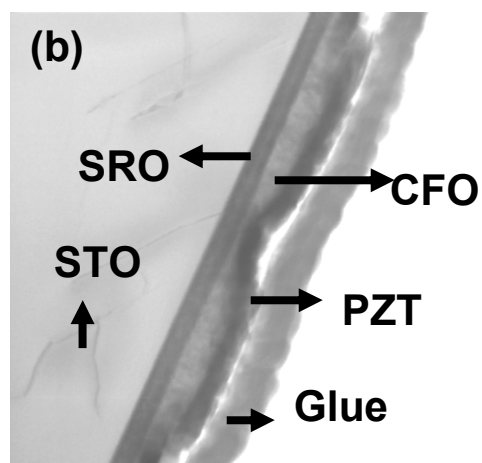
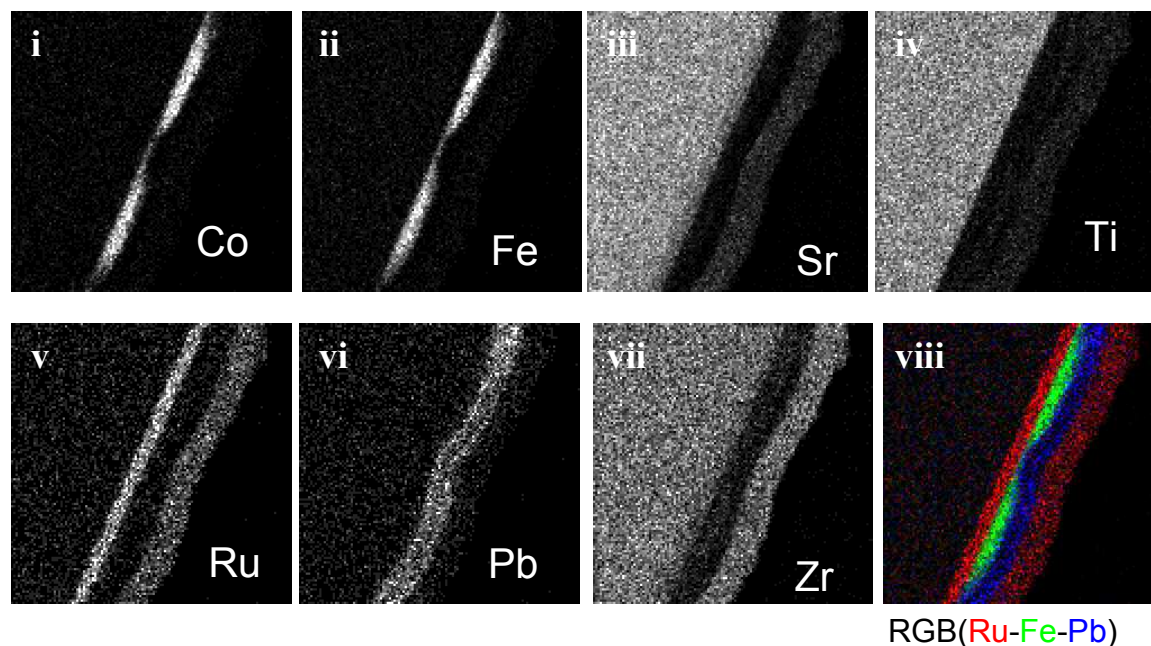


Figure S3 EDX compositional mapping for the TEM cross-section image of a nano-composite of CFO dots covered by PZT. (a) (i-vii) Maps of the individual elements and (viii) combined mapping of three different elements. (b) is the TEM cross-section image and (c) is the EDX spectrum of the composite. The topmost layer is a contamination layer that comes from the ion-beam thinning process during conventional cross-section preparation. The size of each image is $900 \times 900 \text{ nm}^2$.

Supplementary Figure 4

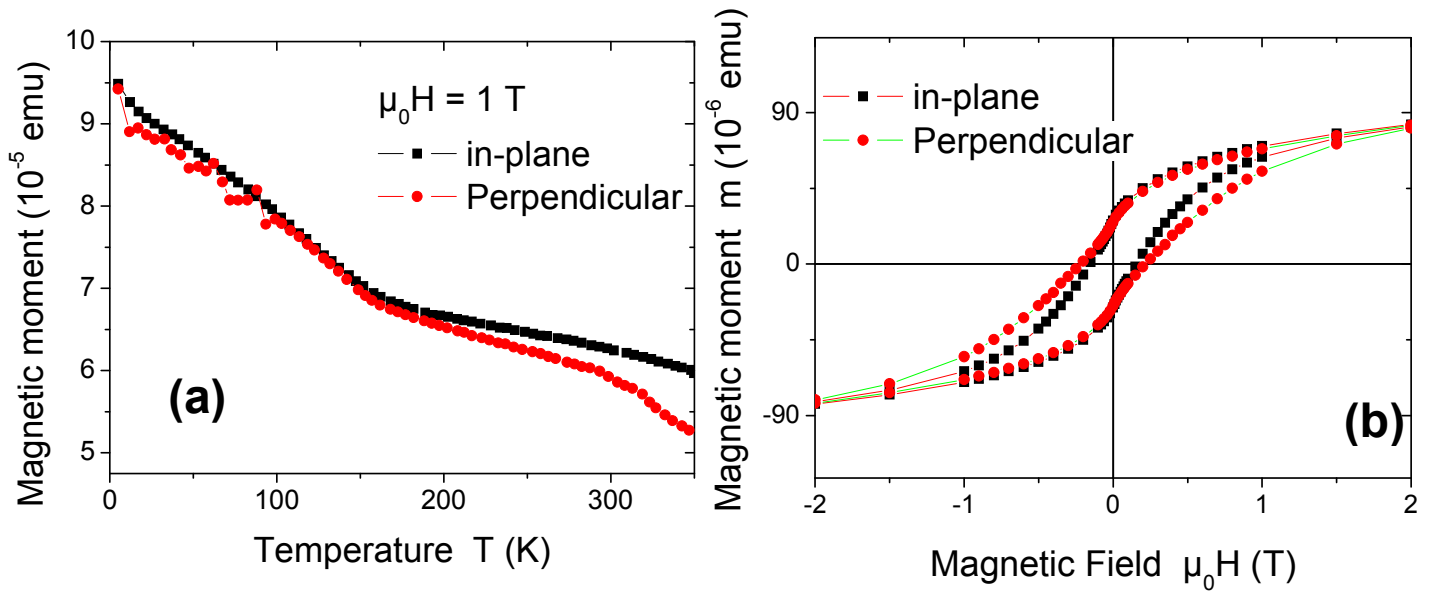


Figure S4. (a) Magnetization as a function of temperature along both in-plane and out-of-plane directions for the CFO dots covered by PZT. The bend in the magnetization curve at 145 K is from the SRO buffer layer in which a magnetic phase transition occurs at this temperature. (b) Magnetic hysteresis curve of bare CFO dots (i.e. without a PZT layer) showing a cubic-like magnetic anisotropy.