Supporting materials for:

Solid State Synthesis of Perovskite-Spinel Nanocomposites **

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As further proof to support the discussions in our manuscript, EDS spectra were obtained using a HRTEM. Because Iron is the element with high concentration within the MZF phase, we selected its element peaks draw out distribution curve (shown in Fig.S1b). Fig. S1a shows the EDS data of a line scan, obtained at six positions. These points “P1-P6” are marked in Fig.S1c and are the same areas as shown in Fig. 2d. It shows that there are different amount of elemental Fe in these different areas.

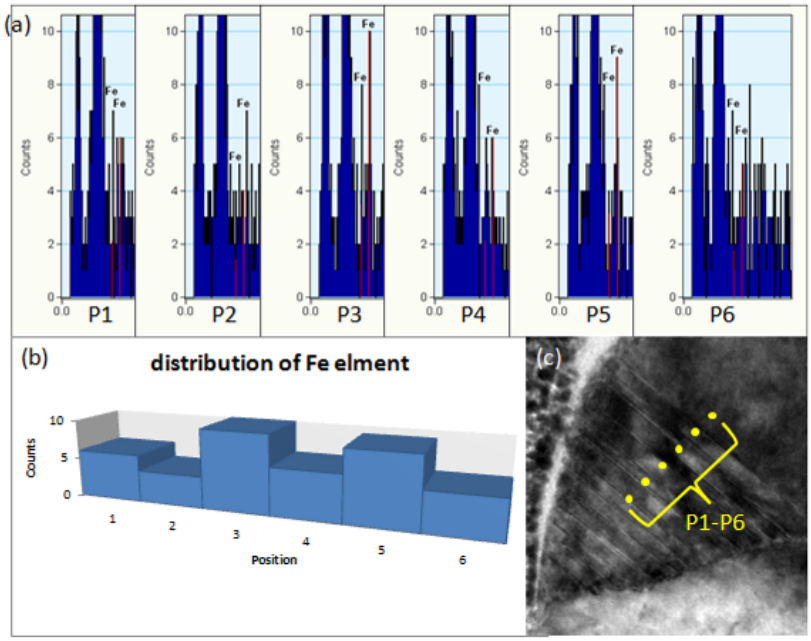

Figure S1. (a) EDS spectra were taken from six different points shown in (c) HRTEM image. (b) Iron element distribution profile base on these spectra shown in (a).

Here also provide more MFM pictures obtained from a different rod sample to support our result mentioned in the manuscript. Similar to the description given in the manuscript: The strongest electric signal was obtained from the apex of a rod lying in-plane (AFM image in Fig. S2), and the strongest magnetic signal was obtained from the two sides of a rod (MFM image in Fig. S2). The strongest magnetic signal was obtained from the bright area in the MFM image, whereas that for the low/non magnetic signal was from the other areas of the image such as the center of the rod and substrate.

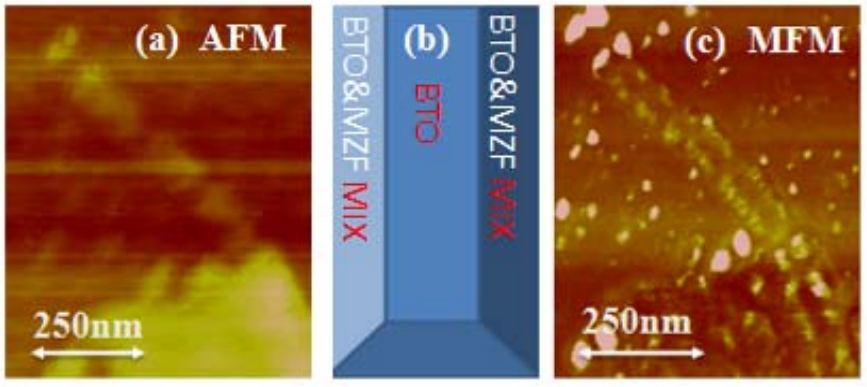

Figure S2. AFM (a) and MFM(c) measure from a rod; and (b) is the schema of the phase distribution in one rod.

To understand the growth process, more images of reaction time dependent samples are presented here. Fig.S3a is the mixed starting raw powders, which show the irregular shape and non-uniform size of the reagent particles. After a 10min treatment, a rectangular nanostructures (approximately 20nm in width and 60nm in length, see Fig.S3b) formed. At this stage, the particles looked like regular rectangles, without extra facets. On increasing the reaction time to 20min, both the density and size of these rectangular particles increased (approximately 40nm in width and 80nm in length, see Fig.S3c). Fig.S3d was obtained after reaction for 60min, where the bigger rectangular nanostructures formed via merging with neighboring particles.

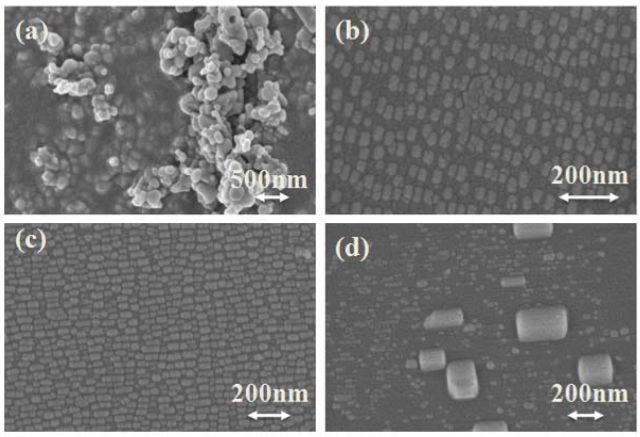

Figure S3. SEM images of the sample taken at different reaction time to understand the growth process: (a) is the mixed raw reagent powders; (b) is after reacting for 10min; (c) is after reacting for 20min; and (d) is after reaction for 60min.