Supporting Information: FeCo Nanowire-Strontium Ferrite Powder Composites For Permanent Magnets with High Energy Products

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Figure S1 shows SEM images of the dry powders corresponding to 30 and 100 nm diameters. In them, a narrow dispersion of diameters is observed for both diameters. The 100 nm diameter nanowires (NWs) have average length of approximately 2 μm.

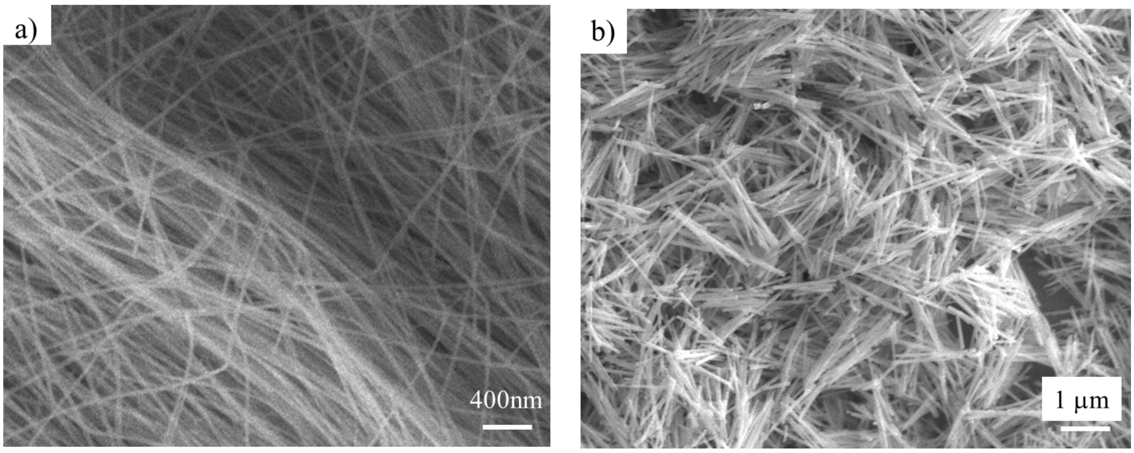

Figure S1. SEM images of (a) NW (30 nm) powders, (b) NW (100 nm) powders.

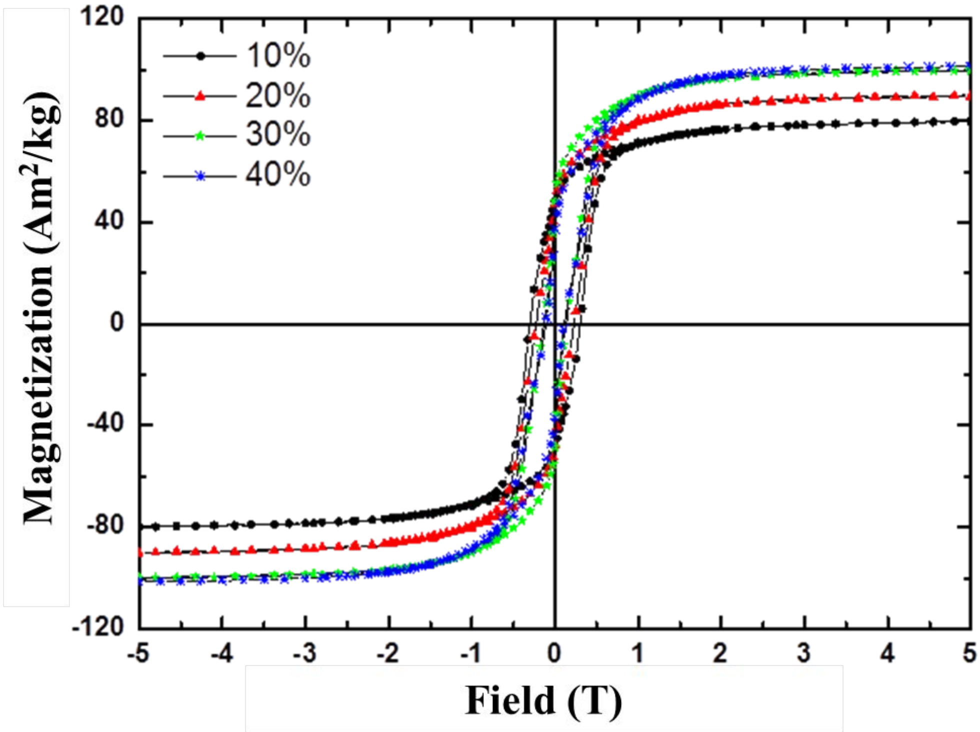

Figure S2. Magnetization curves of NW (100 nm)-ferrite composite powders.

Figure S2a shows the magnetization curves of $SrFe_{12}O_{19}$ (strontium ferrite)-NW (100 nm) composites with different NW concentrations between 10-40 wt%. Figure S2b presents the values of H_c, M_s and M_r as a function of the NW content. The M_s of the composites increases linearly with the NW content, as expected, reaching M_s = 100 Am^2/kg for 30 wt%. Unsurprisingly as well, H_c decreases with NW content, with H_c = 98 kA/m for 30 wt%, a considerably lower value than that of the 30 wt% NW composite made with 50 nm NWs described in the article (130 kA/m).

In order to study the long time stability of the metallic NWs, Figure S3 shows the magnetization curves of the non-oriented 50 nm NWs powder several days after drying the powder (called as-synthesized), and 1 year after drying the powder (called 1 year after). We observe the same magnetization value for both samples M_s = 150 Am^2/kg. The shape of the curve and the coercivity are very similar too. This indicates that the NWs have not further oxidized after 1 year. It is worth noting that they were simply stored inside a sample tube and no dessicator was used. As suggested by the TGA in Figure 2d of the main text, the passivating layer seems to robustly protect the NWs from oxidation.

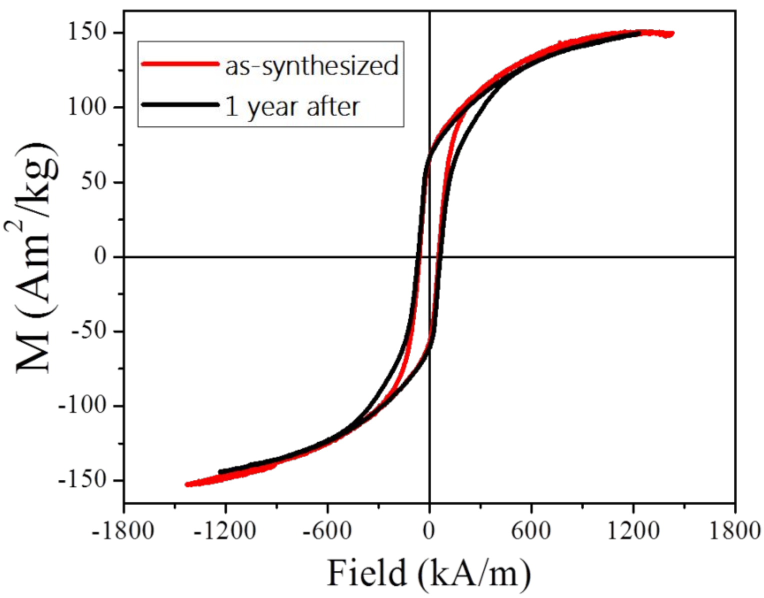

Figure S3. Magnetization curves at room-temperature of non-oriented 50 nm NWs powders measured several days after exposing the dry powder to air (as-synthesized), and 1 year after.