

SUPPLEMENTARY INFORMATION

Coercivity limits in Nd-Fe-B hot-deformed magnets with ultrafine microstructure

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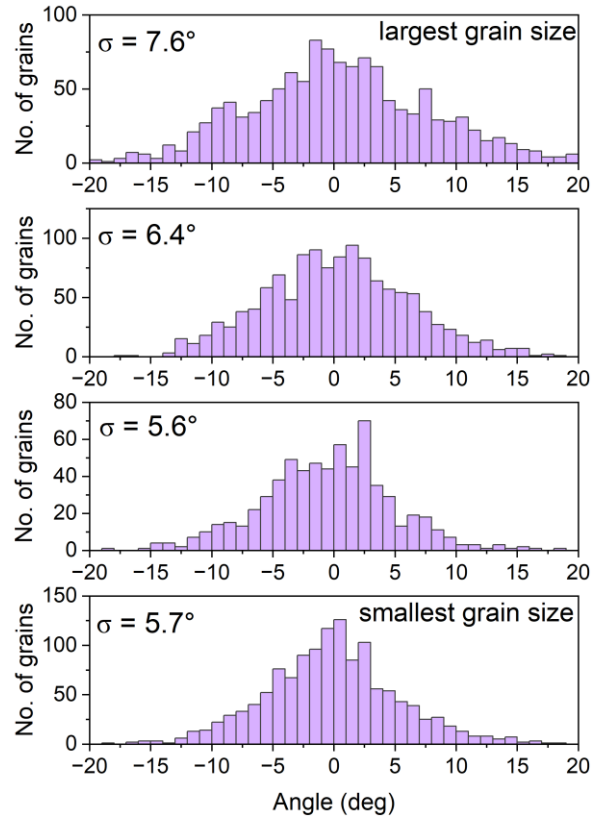


Figure S1: Distributions of the grain inclination angles measured for samples of hot-deformed magnets with different grain sizes (average grain size decreases from top to bottom).

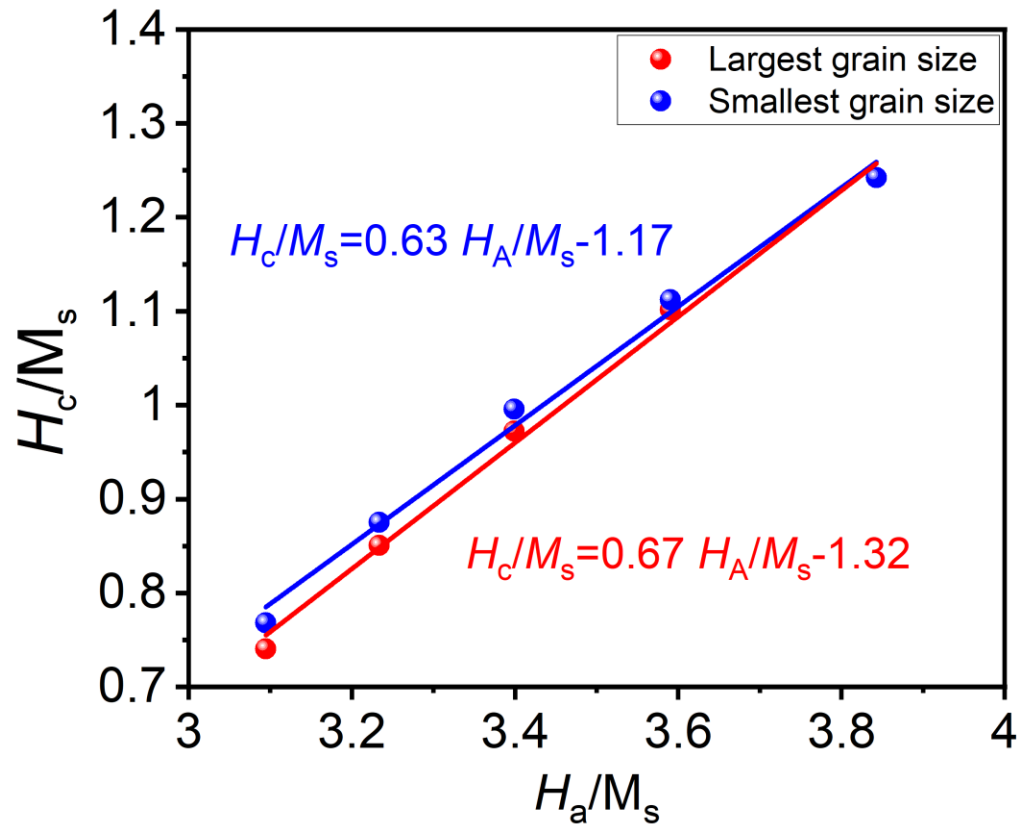


Figure S2: $H_c(T)/M_s(T)$ versus $H_A(T)/M_s(T)$ plots with linear fit measured for samples of hot-deformed magnets with smallest (blue dots and line) and largest (red dots and line) grain size.

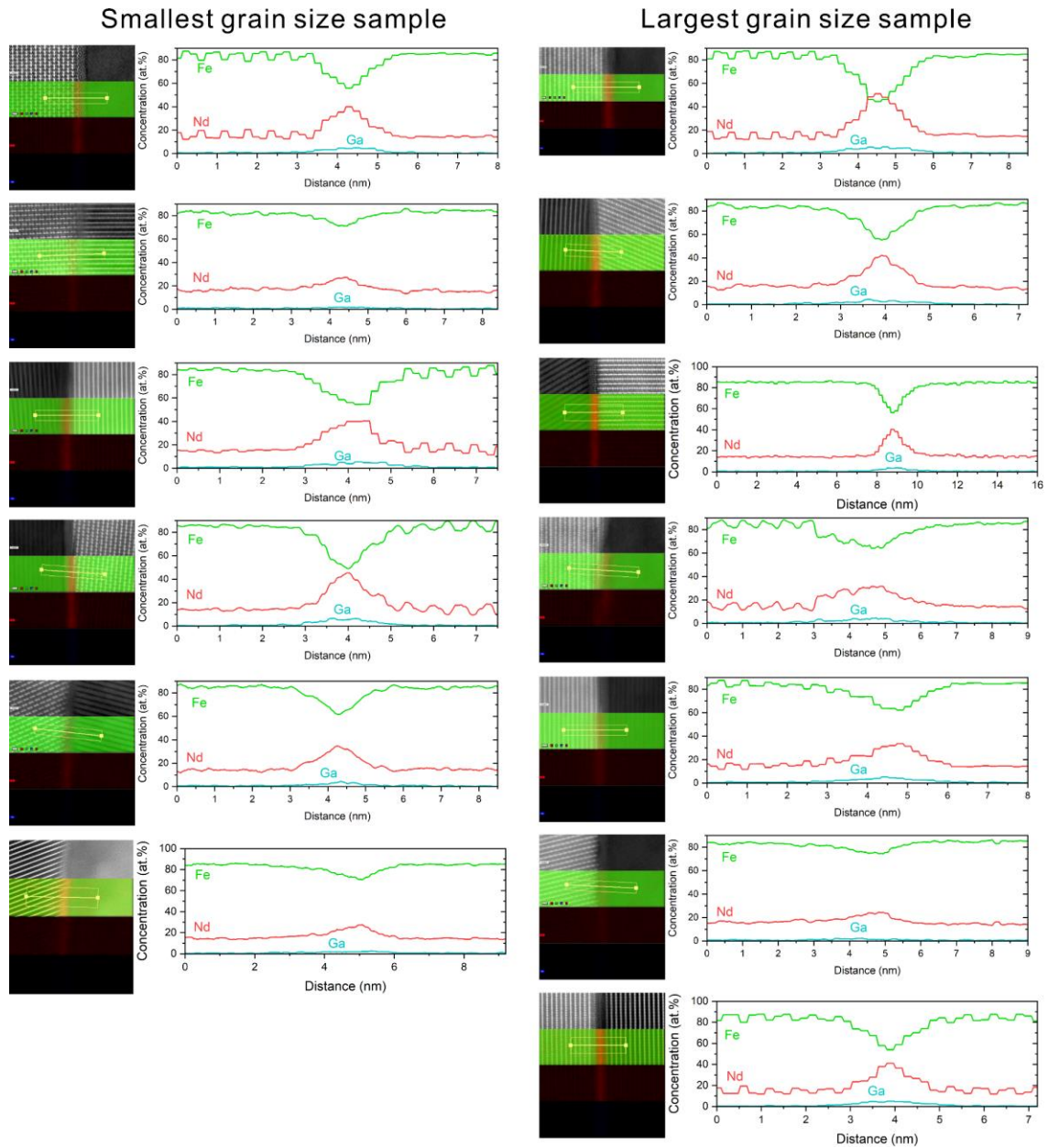


Figure S3: High magnification HAADF-STEM images with STEM-EDS maps for hot-deformed samples with the smallest (left) and the largest (right) average grain size. The composition line profile across the IGP is shown in the right side of each HAADF-STEM image.

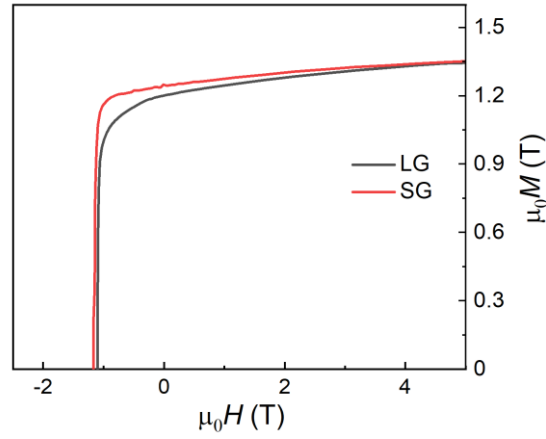


Figure S4: Demagnetization curves measured at elevated temperature of 380 K for sample with largest (LG) and smallest (SG) grain size.

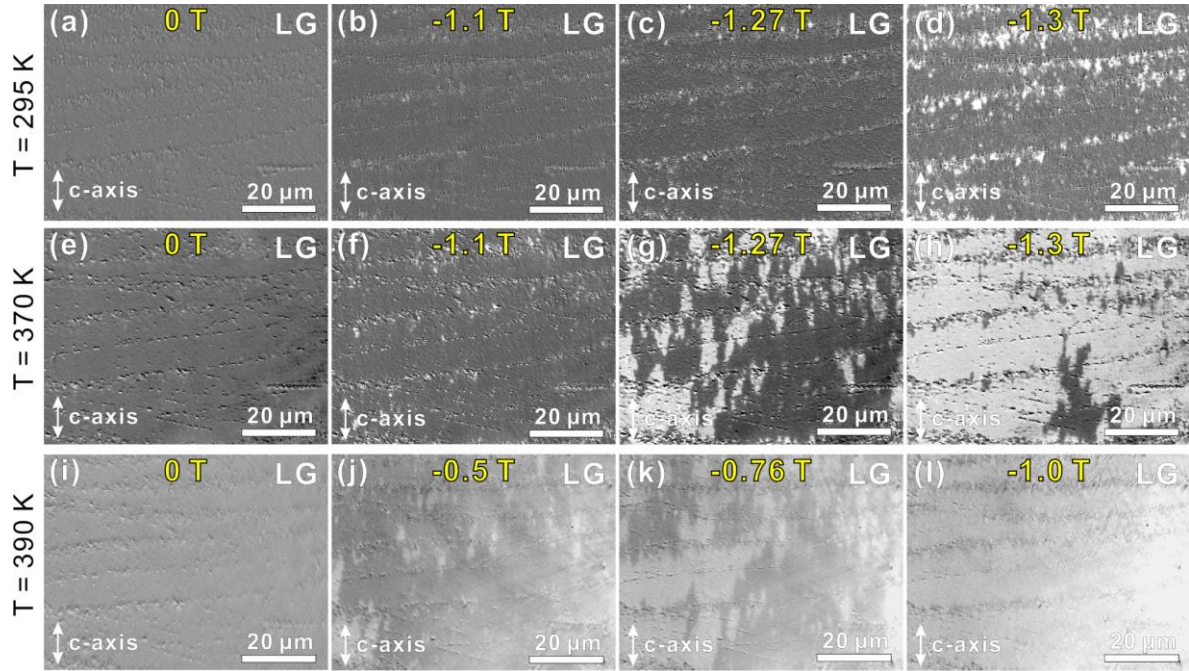


Figure S5: Sequential MOKE microscopy images obtained by applying opposite magnetic field (value is indicated in yellow font) along the *c*-axis to the initially saturated (under 5T external magnetic field) hot-deformed magnet with the largest grain size at various temperatures (temperature values for each corresponding row are shown on the left-hand side).

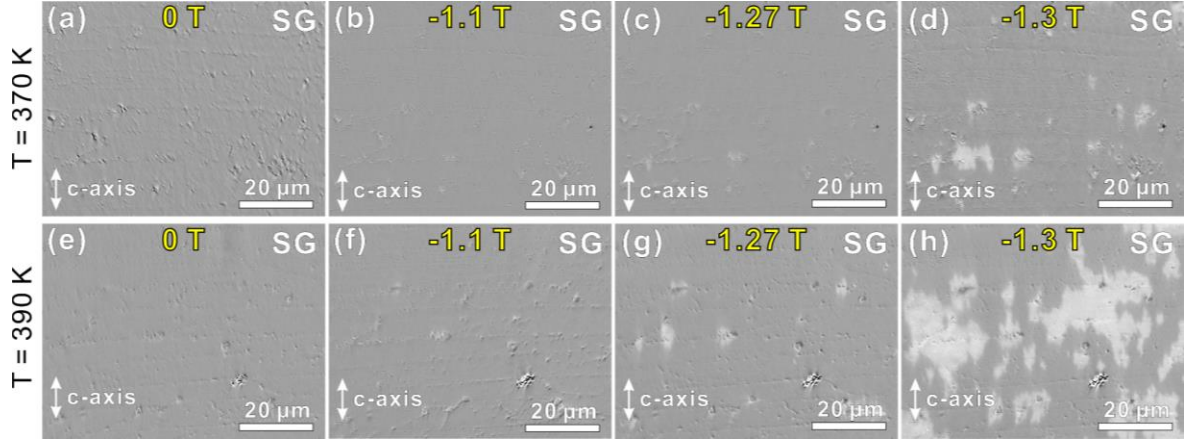


Figure S6: Sequential MOKE microscopy images obtained by applying opposite magnetic field (value is indicated in yellow font) along the c -axis to the initially saturated (under 5T external magnetic field) hot-deformed magnet with the smallest grain size at various temperatures (temperature values for each corresponding row are shown on the left-hand side). Images obtained at room temperature ($T = 295$ K) are not shown here since the applied magnetic field was not enough to initiate magnetization reversal.

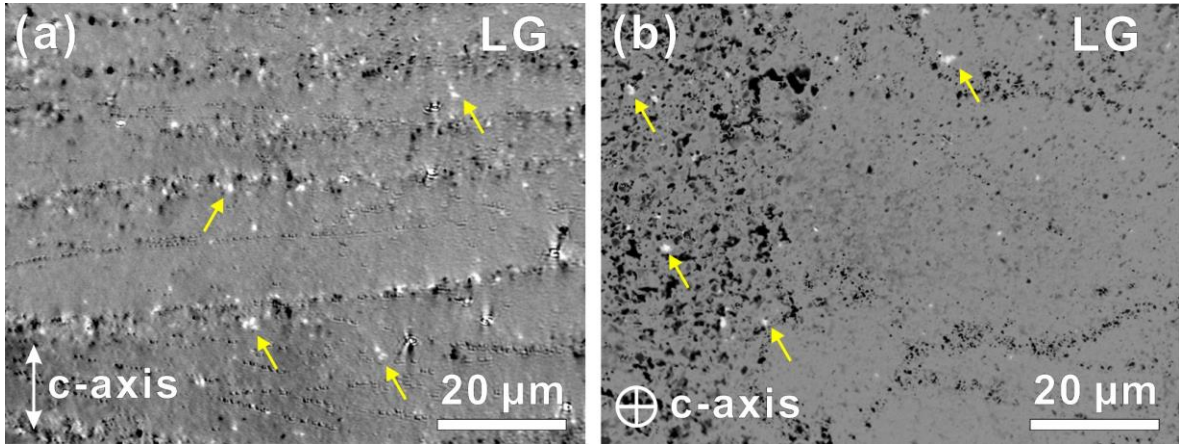


Figure S7: Polar MOKE images obtained for the hot-deformed magnet with the largest grain size. (a) shows the presence of large grains with misoriented c -axis (selected sites with strong out-of-plane magnetization component are shown with yellow arrows). The image is obtained at 390 K by taking a background image at remanence and subtracting it from the image taken after applying opposite magnetic field of 0.3 T. Image (b) shows magnetization reversal sites at remanence after magnetizing the sample in the pulsed magnetic field of 5 T.