

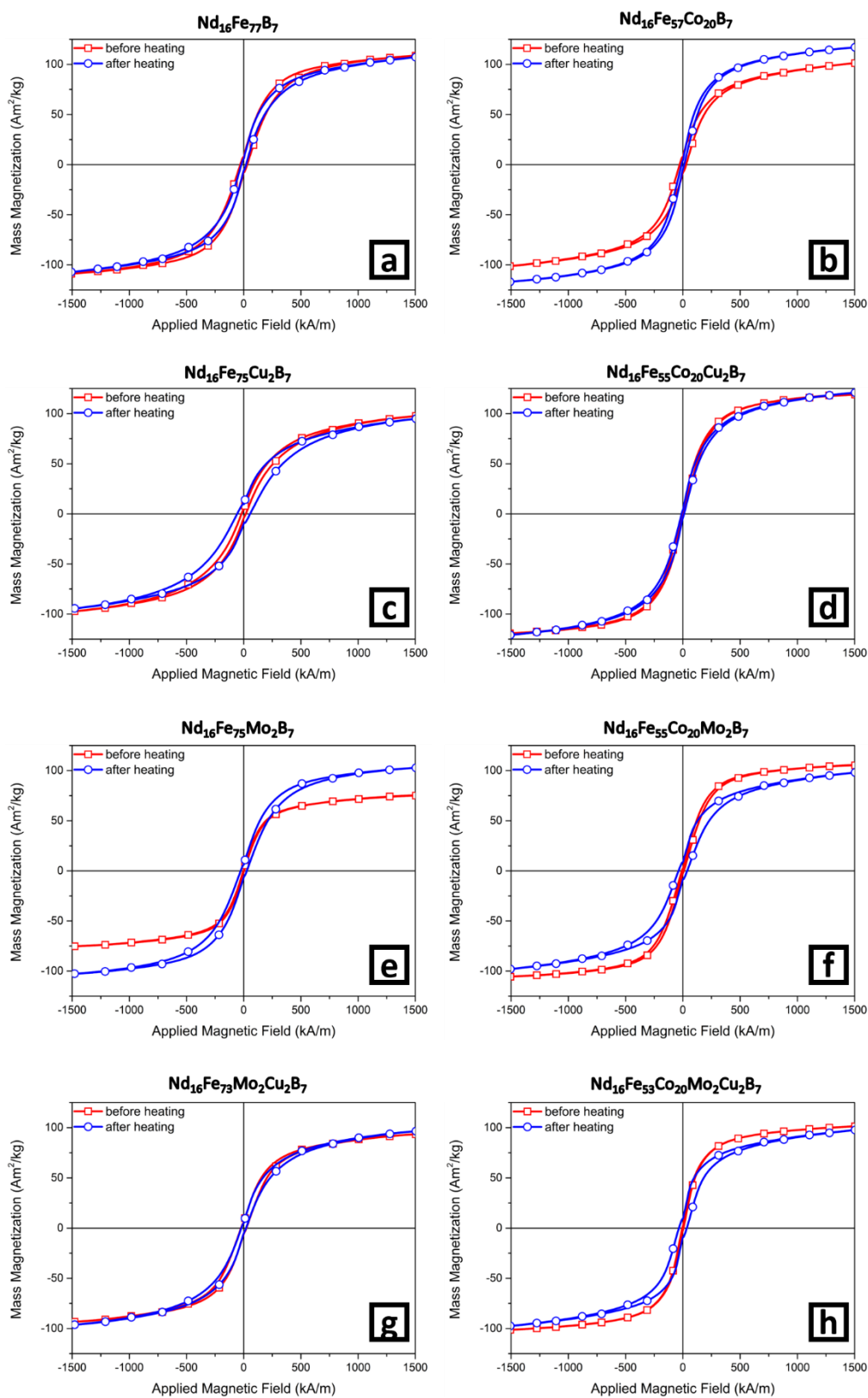
Supporting Information

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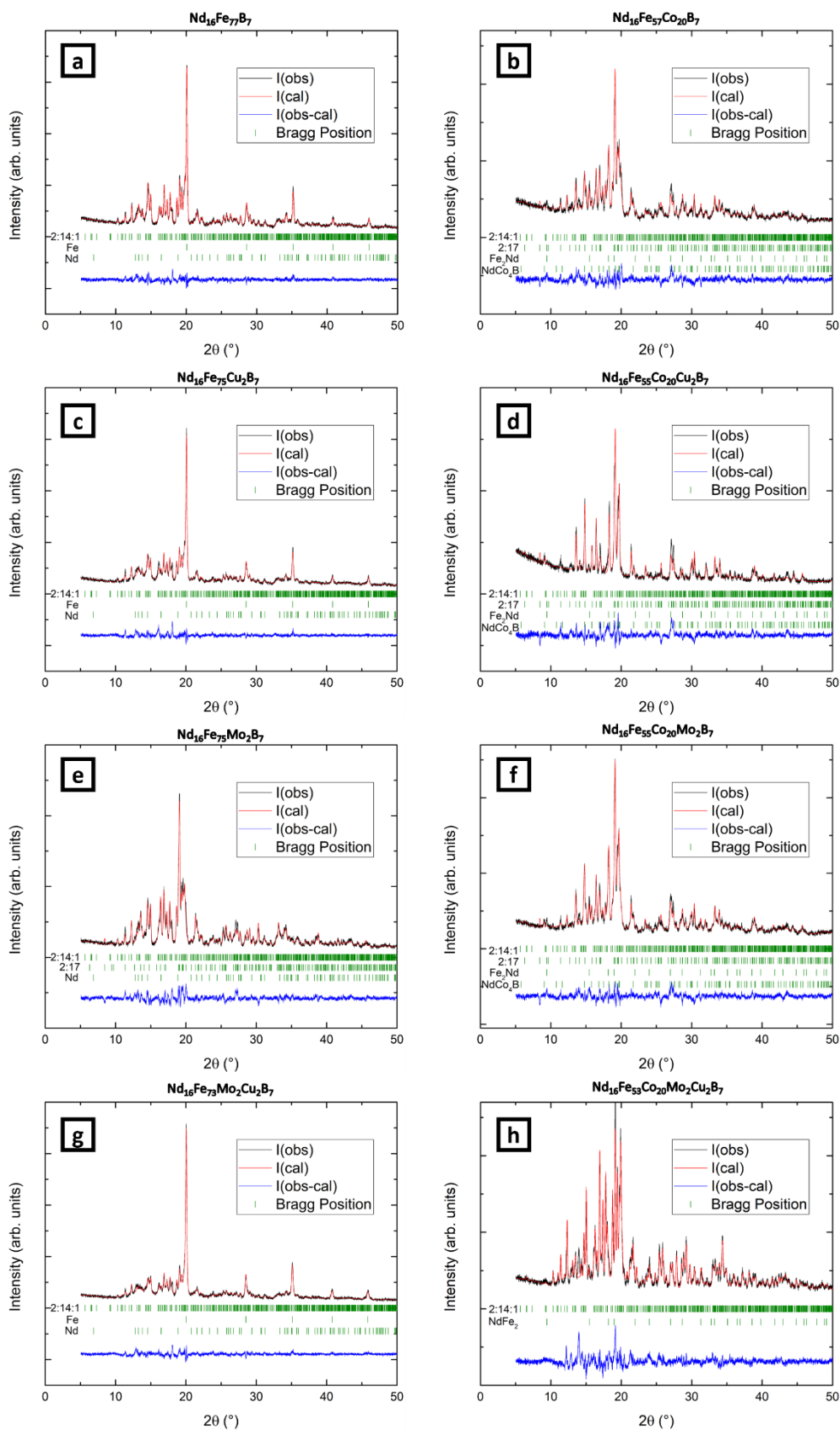
A Novel Magnetic Hardening Mechanism for Nd-Fe-B Permanent Magnets Based on Solid-State Phase Transformation

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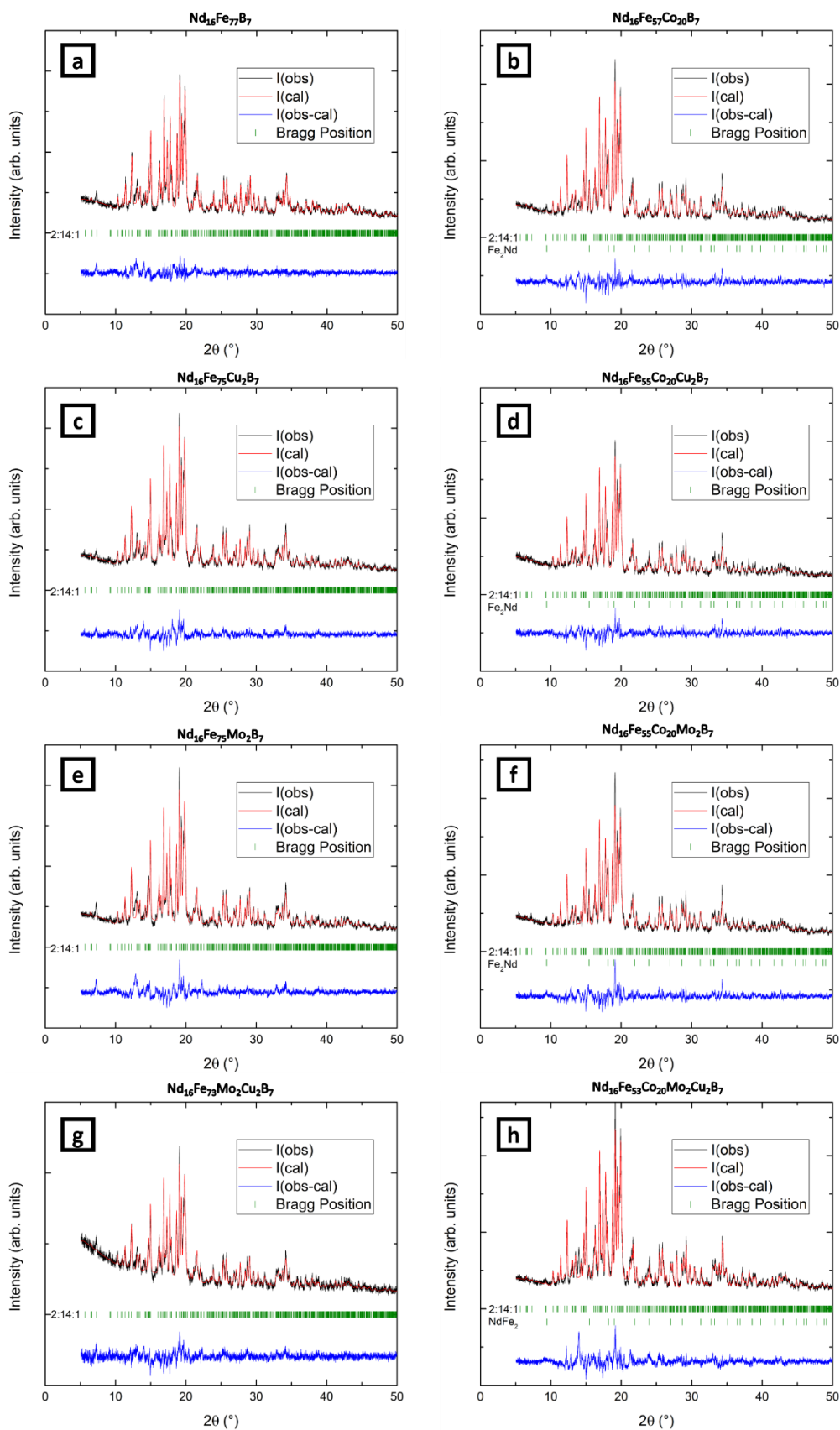
Supplementary



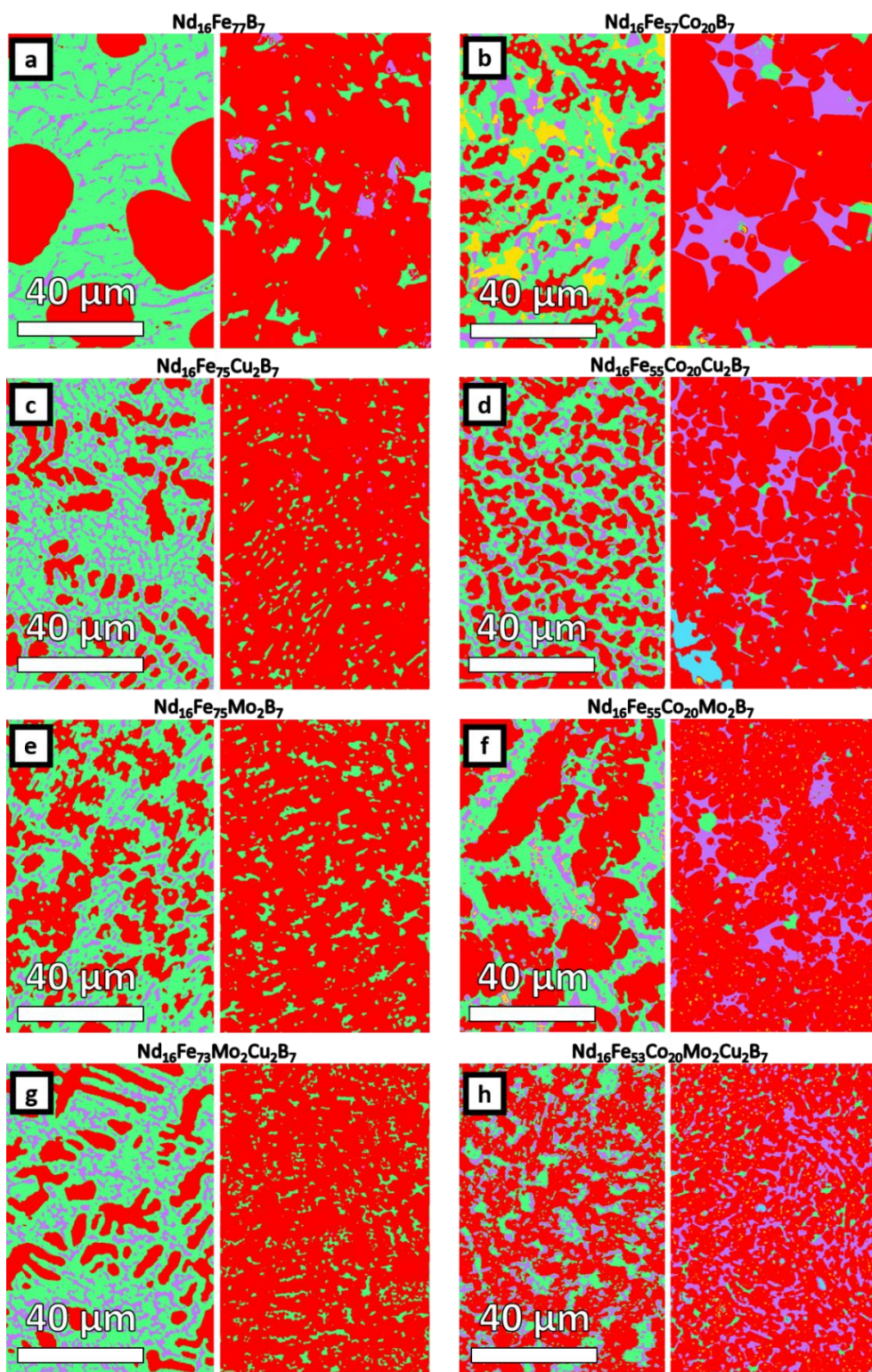
Supplementary 1: Magnetic hysteresis for the samples before heating and after cooling during the thermomagnetic measurements. None of the samples shows an increase in coercivity. The quasi-annealing treatment does not improve the magnetic properties.



Supplementary 2: XRD diffractograms of the samples in quenched state. The crystal structure of the binary Nd_2Fe_{17} could be matched with the metastable phase occurring in the presented samples. Furthermore, the $NdFe_2$ Laves phase and $NdCo_4B$ phase could be fitted to the intensities.



Supplementary 3: XRD diffractograms of the samples in annealed state. The metastable $\text{Nd}_2\text{Fe}_{17}$ phase and NdCo_4B phase vanish after the annealing treatment. The diffractograms only indicate the $\text{Nd}_2\text{Fe}_{14}\text{B}$ and NdFe_2 variants after the controlled heat treatment and microstructural transformation.



Supplementary 4: Images represent the post processing for the qualitative analysis of the phase fractions – the SEM-BSE images, in the original contrast, are given in Figure 2 of the manuscript. Using ImageJ and a Trainable Weka Segmentation, the phases could be identified by the contrast from the SEM-BSE images. The colors do not correspond to the same phases. By combining the XRD results and the SEM-BSE contrast, the phases were assigned manually.