

Supporting Information

Effect of Carbon Addition and Mechanical Activation on FeNi Alloys for Permanent Magnet Applications

Valmir R. da Silva ¹, Øystein S. Fjellvåg ¹, Anuj Pokle ², Bjørn C. Hauback ¹ and Stefano Deledda ^{1,*}

¹ Department for Hydrogen Technology, Institute for Energy Technology, 2007 Kjeller, Norway

² Department of Physics and Centre for Materials Science and Nanotechnology, University of Oslo, 0313 Oslo, Norway

* Correspondence: stefano.deledda@ife.no

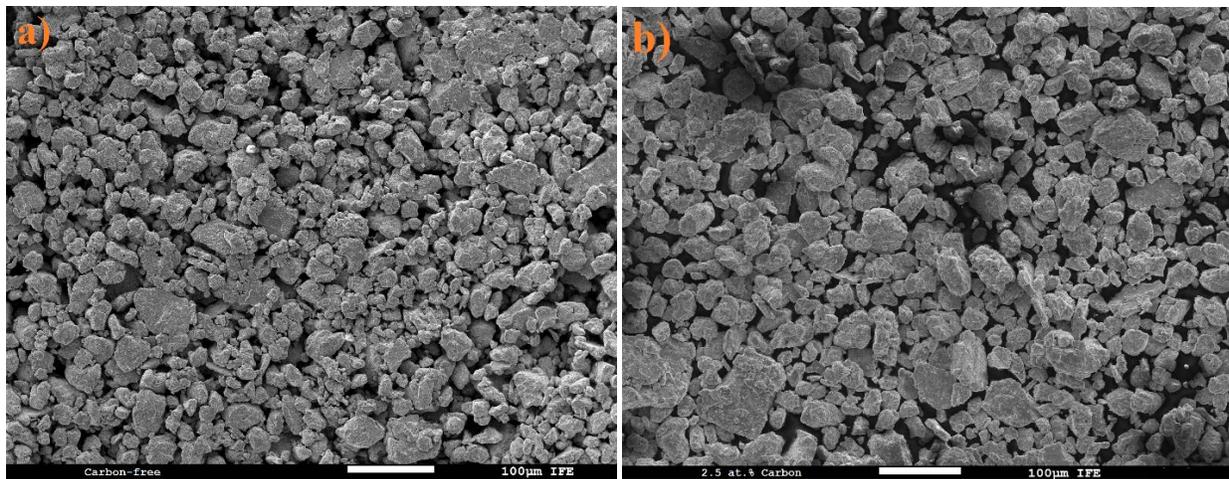


Figure S1. SEM images of 5-h ball-milled powders, carbon-free (a), and 2.5 at.% of carbon (b). Particle size ranges from 5 to 100 μm .

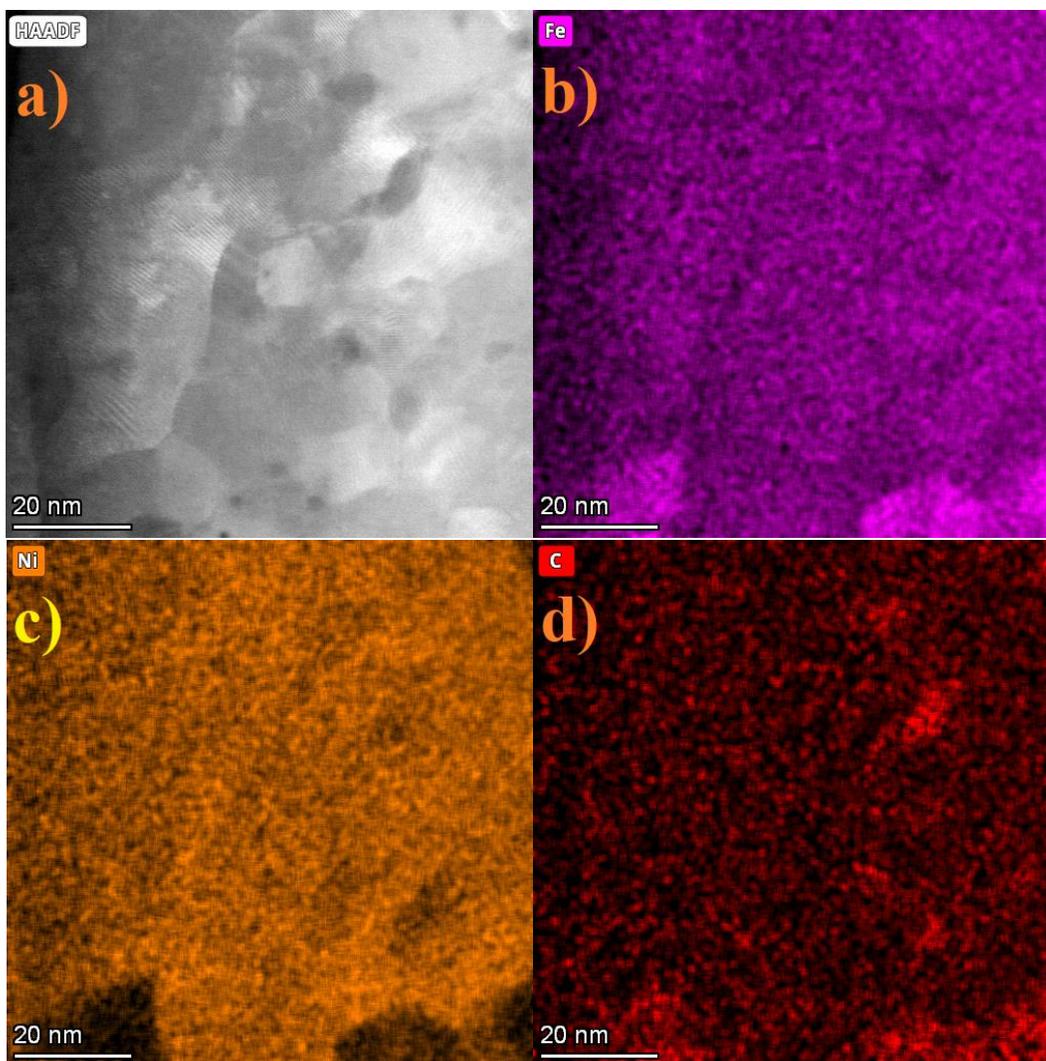


Figure S2. STEM images of annealed samples with 5 at.% of carbon. (a) Bright field, (b) dark field, (c) HAADF and EDS mapping of Fe, Ni, C, (d) respectively. Region deliberately selected to show small heterogeneity between elements.

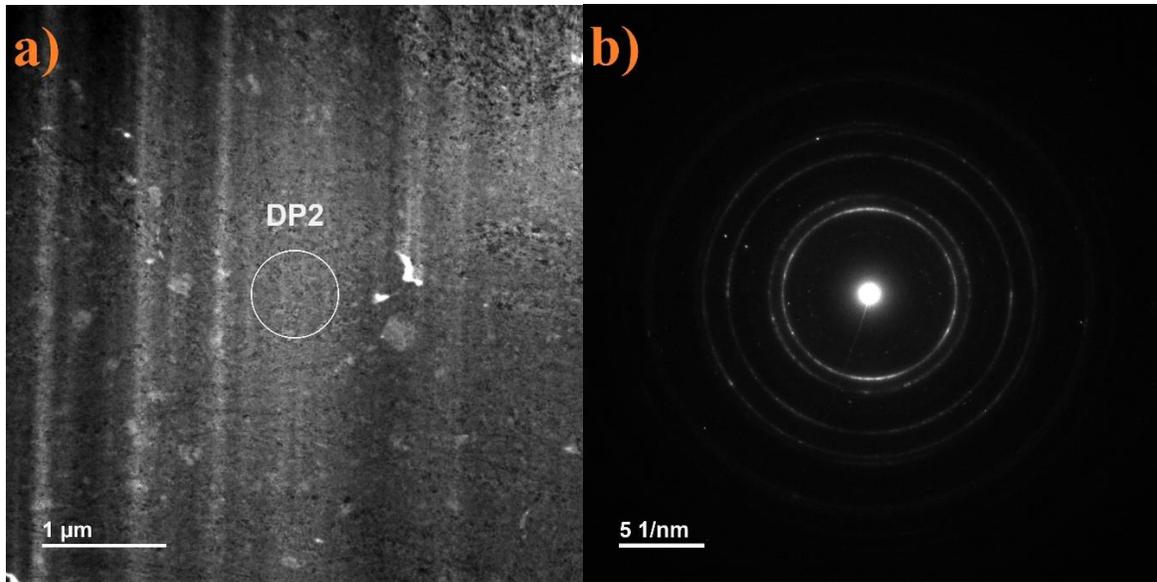


Figure S3. STEM image of a cryomilled and subsequently annealed sample with 5 at.% of carbon (a), and SAED from the circled area (b). Since the selected area is larger than the crystallite size, it results in a polycrystalline diffraction pattern. Hence, it remains to be clarified if carbon and its relative content affect local ordering and result in the formation of the $L1_0$ phase.

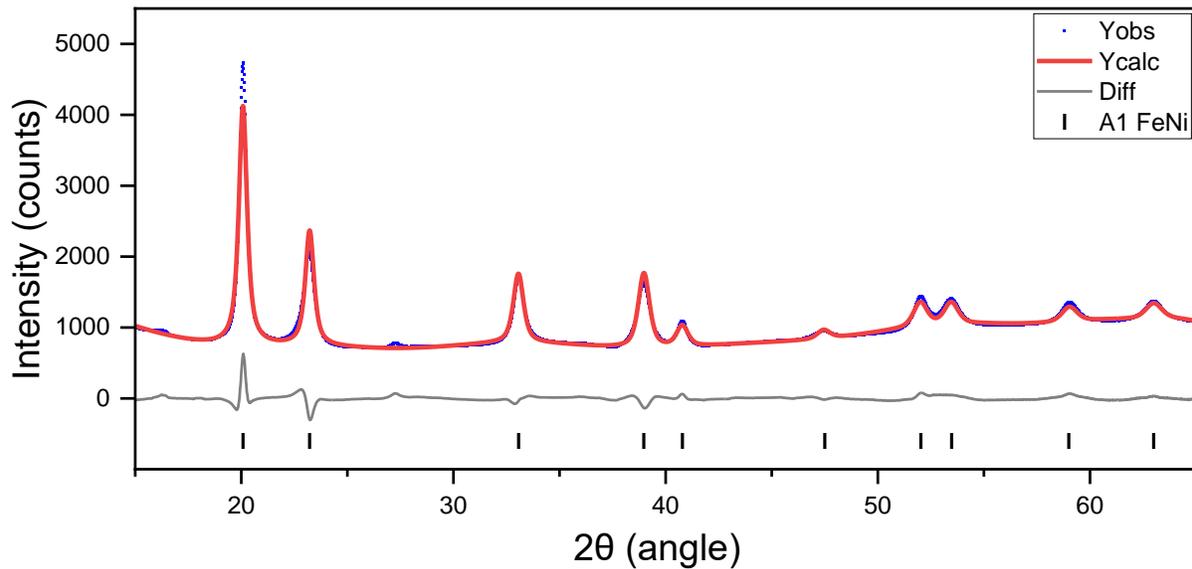


Figure S4. Rietveld refinement of synchrotron PXD data for the carbon-free sample, cryomilled after 3 h, and annealed for 1000 h at 583 K. Blue dots represent the measured data, the red line is the single-phase model used in the refinement, and the gray line is the difference. Rwp: 2.80.