

## Electronic Supporting Information (ESI)

### Optimization of magnetic properties in fast consolidated $\text{SrFe}_{12}\text{O}_{19}$ nanocrystallites

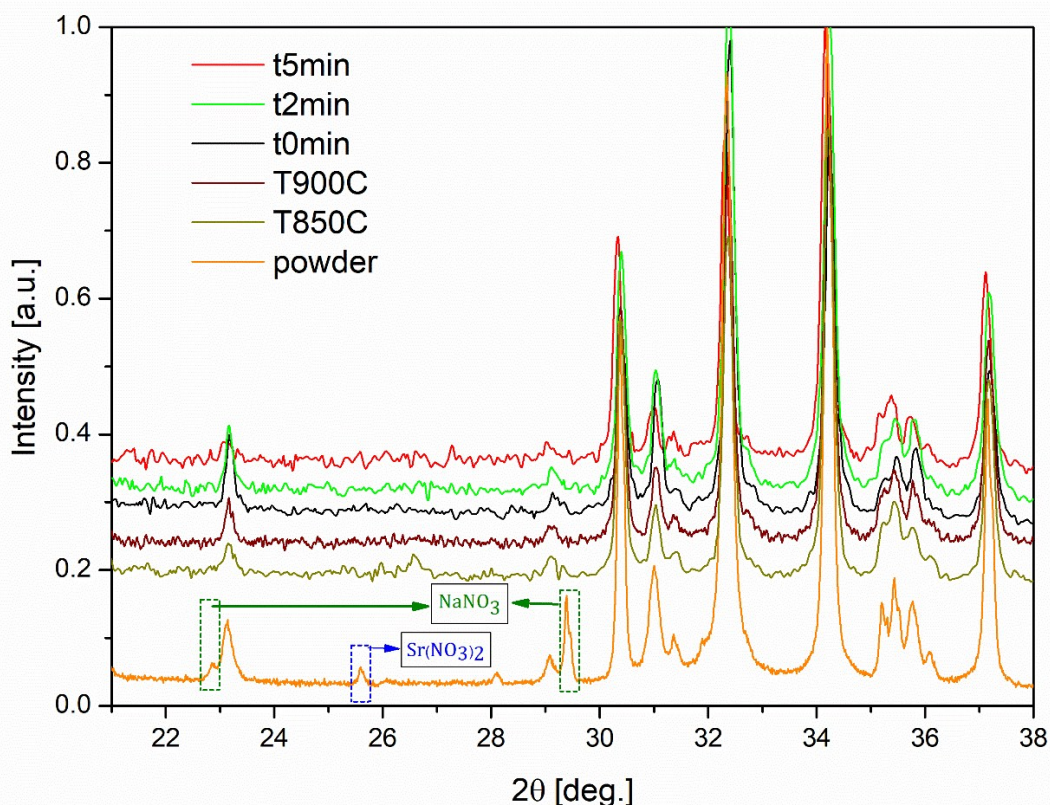
Marian Stingaciu,<sup>a,b</sup> Anna Zink Eikeland,<sup>a</sup> Frederik Holm Gjørup,<sup>a</sup> Stefano Deledda<sup>b</sup> and Mogens Christensen<sup>\*a</sup>

<sup>a</sup>Center for Materials Crystallography, Department of Chemistry and Interdisciplinary Nanoscience Centre (iNANO), Aarhus University, DK-8000 Aarhus C, Denmark

<sup>b</sup>Department for Neutron Materials Characterization, Institute for Energy Technology, Instituttveien 18, NO-2007 Kjeller, Norway

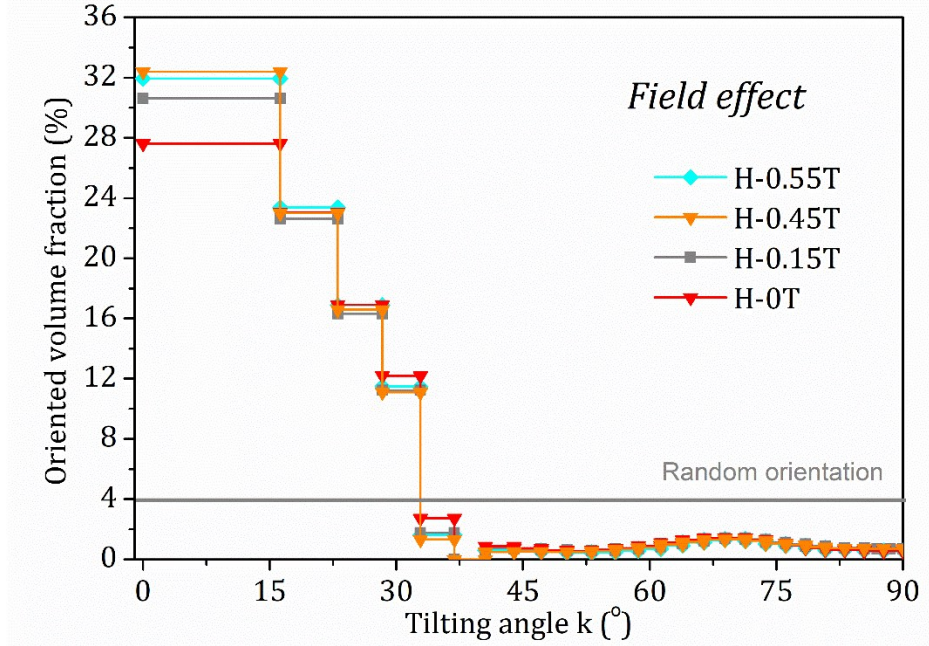
\*E-mail: [mch@chem.au.dk](mailto:mch@chem.au.dk)

#### Powder X ray diffraction data after SPS



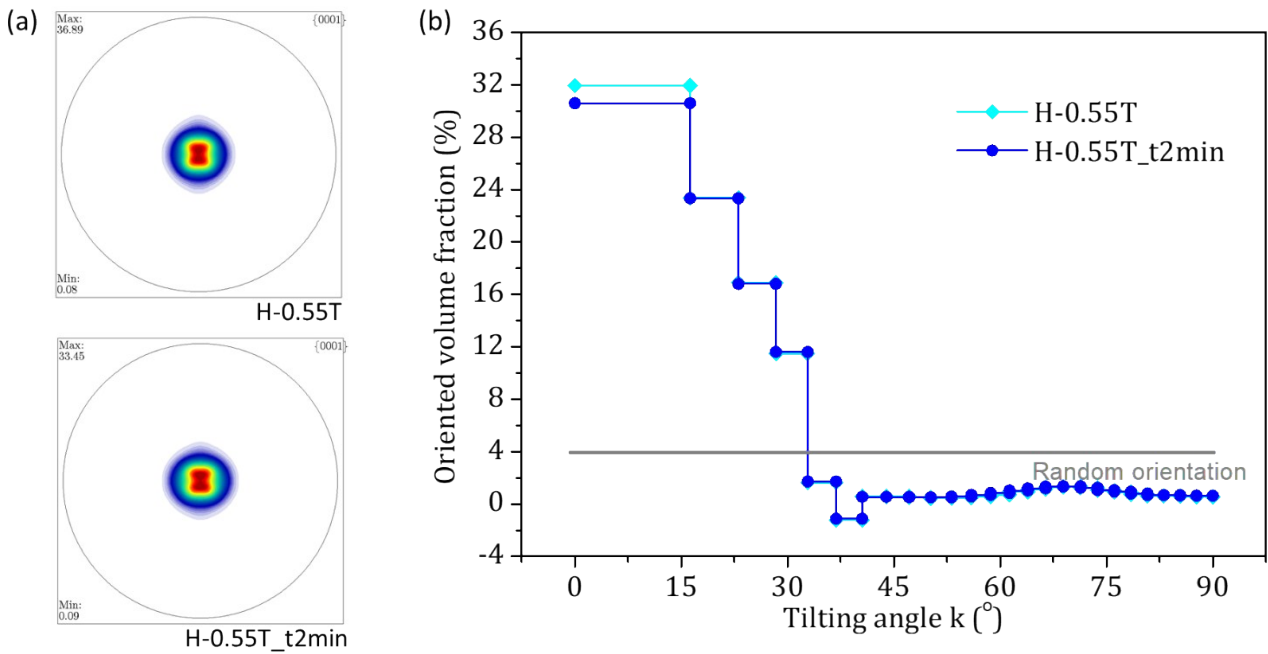
**Fig.1** PXRD patterns obtained on crushed SPS pellets. After sintering the traces of  $\text{Sr}(\text{NO}_3)_2$  and  $\text{NaNO}_3$  are not detected anymore. The bottom pattern represents the results of the powder with the  $[\text{Sr}:\text{Fe}]=[1:4]$  molar ratio, prior SPS.

### The effect of pre-alignment in magnetic field prior SPS

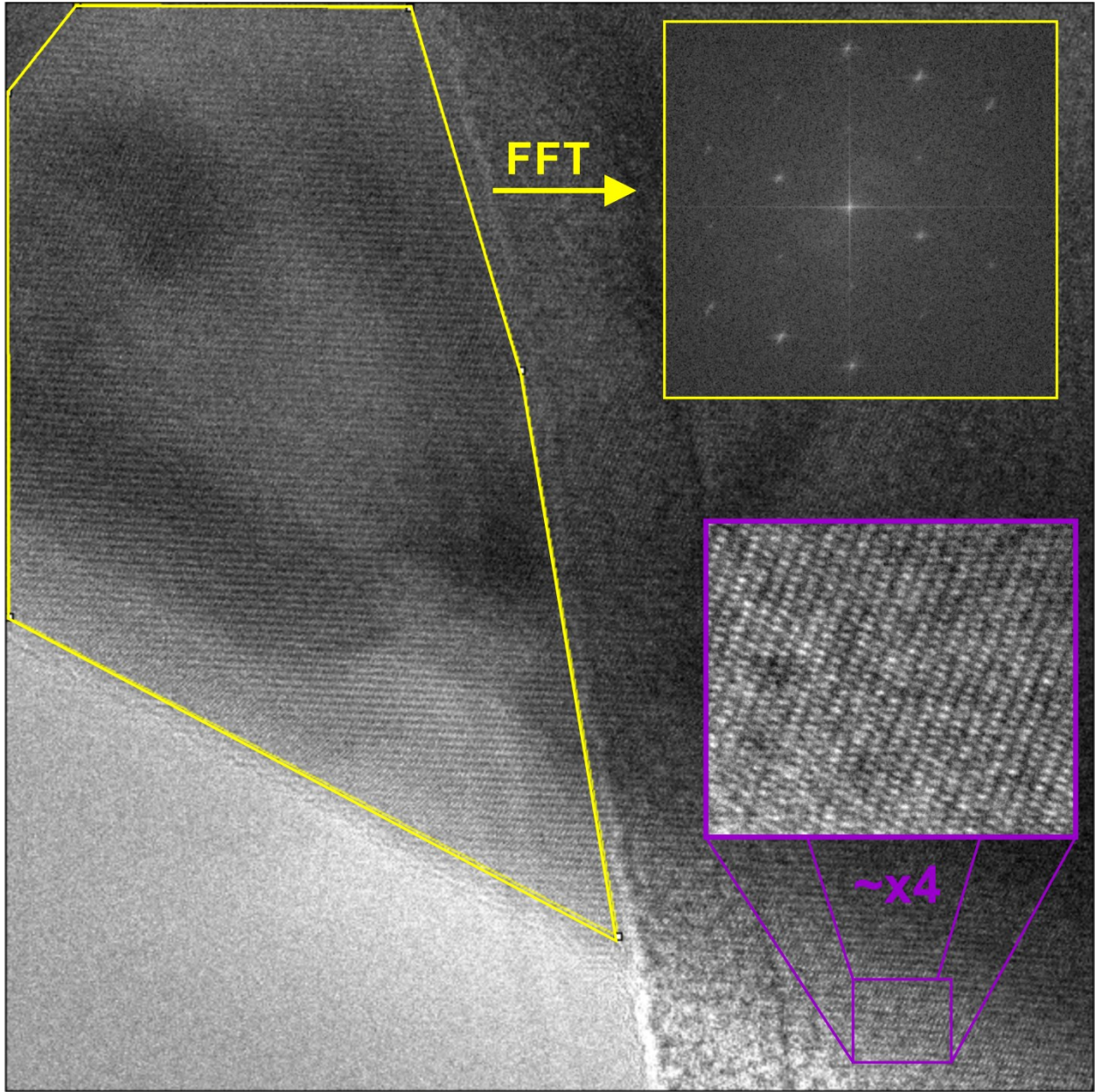


**Fig.2** Oriented volume fractions of pre-compacted SFO powder in 0T, 0.15T, 0.45T and 0.55T and SPS consolidated.

### The effect of pre-alignment in 0.55T and sintering for 2 and 5 minutes



**Fig.3 (a)** The (001) X-ray pole figures of SPS pellets pre-aligned in 0.55 T and sintered for 2 (H-0.55T\_t2min) and 5 minutes (H-0.55T) **(b)** The corresponding oriented volume fractions.



**Fig.4** High resolution transmission electron micrograph collected with a FEI TALOS F200A analytical electron microscope equipped with an X-FEG electron source and a Ceta 16M camera. The image shows a zoom on a hexagonal platelet. The yellow area is fast Fourier transformed (FFT) in the upper right insert. The lower right outlines in purple shows a four times magnification allowing to see the atomic resolution. The TEM image testifies to the single crystal nature of the hexagonal platelets.