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Electronic Supplementary Information

Glass-like structure of iron-nickel nanochains produced by magnetic-field-induced reduction reaction with sodium borohydride

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Figure S1 presents the comparison of the atomic pair distribution function (PDF) data obtained for $Fe_{0.75}Ni_{0.25}$, $Fe_{0.50}Ni_{0.50}$ and $Fe_{0.25}Ni_{0.75}$ nanochains with the single-phase models. These experimental data were derived from the wide-angle X-ray scattering measurements. The considered phases in the models were: bcc (body-centered cubic), fcc (face-centered cubic), and hcp (hexagonal close-packed). The best fits for all three compositions were obtained for the bcc and hcp structures. The agreement with the experimental data is comparable for bcc and hcp phases, whereas for fcc structure the peak positions of the model data do not match the experimental data. Besides the quite good agreement of single bcc and hcp models with the experimental data, some discrepancies, in particular, associated with the peak positions, can be also perceived. This suggests that two-phase models should be considered rather than the single-phase model to characterize the structure of these nanochains. The results of fitting the diffraction data with two-phase bcc+fcc, fcc+hcp and bcc+hcp models are presented in the main text of article.

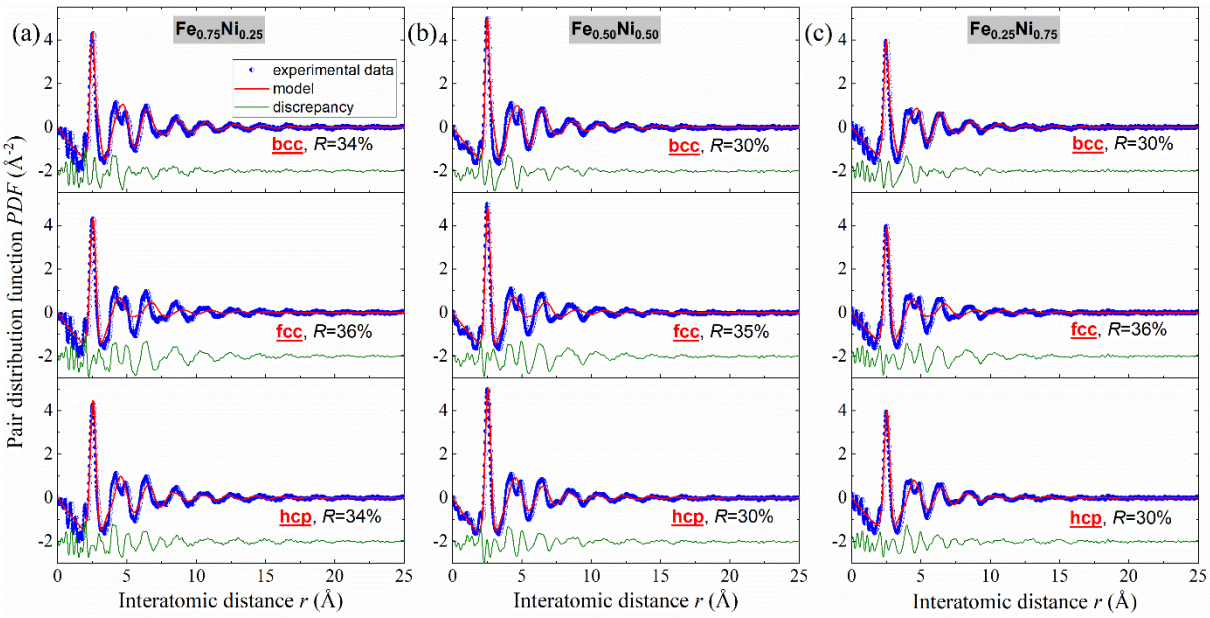

Fig. S1. Fits to the experimental atomic pair distribution function with one-phase bcc, fcc and hcp models for **(a)** $Fe_{0.25}Ni_{0.75}$, **(b)** $Fe_{0.50}Ni_{0.50}$ and **(c)** $Fe_{0.75}Ni_{0.25}$ nanochains.

The data collected in Table S1 contain the parameters used for the fitting of Mössbauer spectra shown in Fig. 9 in the main text of article.

Table S1 The components of Mössbauer spectra and their parameters. Components 1-2: sextets with a continuous distribution of HMF, component 3 – a set of doublets and singlets related to paramagnetic or superparamagnetic phases; p – percentage of the component, IS – isomer shift, QS – quadrupole interaction, <B> – average value of HMF over the component, σ_B – standard deviation of the HMF distribution, B_{av} – average value of HMF over all Fe-bearing phases.

		$Fe_{0.75}Ni_{0.25}$	**$Fe_{0.50}Ni_{0.50}$**	**$Fe_{0.25}Ni_{0.75}$**
Component 1	p_1 [%]	79	75	60
	<B> [T]	22	27.5	19.9
	σ_B [T]	7.5	7.5	7.7
	IS [mm/s]	0.03	0.12	0.06
	QS [mm/s]	-0.03	-0.11	-0.11
Component 2	p_2 [%]	6	8	5
	<B> [T]	48.4	48.3	46.9
	IS [mm/s]	-0.08	0.28	0.05
	QS [mm/s]	-0.15	-0.07	-0.20
Sum of components 1-2	p_1+p_2 [%]	85	83	65
	p_1/p_2	0.07	0.10	0.09
Component 3	p [%]	15	17	35
B_{av}	B_{av} [T]	20	24	14