Supplementary data

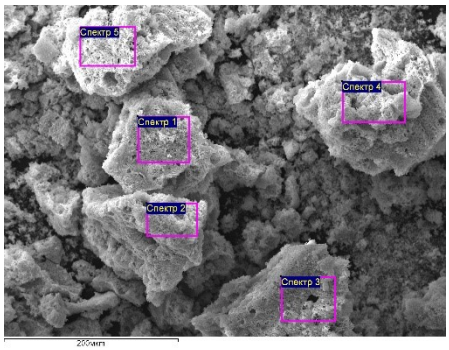
S1. SEM + EDS data

The surface morphology of the samples was investigated using scanning electron microscopes JSM-6460 LV (Jeol, Tokyo, Japan) with a tungsten thermal cathode (E_0) of 20 and 25 keV. The JSM-6460 LV microscope was equipped with an energy-dispersive X-ray spectrometer INCAx-sight (Oxford Instruments, Abindon, England), which made it possible to reveal the chemical composition of subsurface layers of the samples. The spectrometer was calibrated using the standards made of neat Si and Co. The quantitative analysis of the chemical composition of samples was performed on an INCA Energy-350 system (Oxford Instruments, Abindon, England) with the use of internal standards from the spectrometer database. Data were collected from 5 points in 3 different regions.

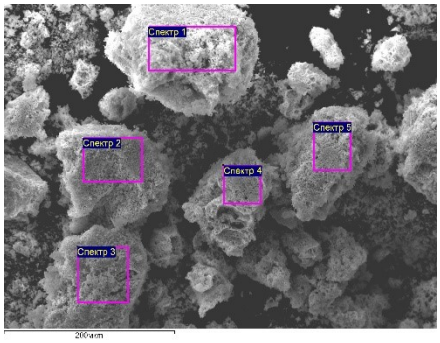
According to the data obtained, the samples are porous particles (agregates) of micron size (up to 100 μm). Within the measurement error of the EDX method, the cationic composition of the samples corresponds to the ratio laid down during synthesis. Detailed data are given below for the LaFe0.6Ni0.4O3 sample - micrographs with selected regions, for which atomic content of elements were obtained. Similar data were obtained for samples of LaFe0.8Ni0.2O3 and LaFe0.4Ni0.6O3, for which only average data are given in the Table.

Sample LaFe0.6Ni0.4O3

Region 1	O	Fe	Ni	La
Spectr 1	56.54	12.12	8.60	22.74
Spectr 2	50.39	13.72	9.58	26.31
Spectr 3	55.03	12.69	8.67	23.60
Spectr 4	55.85	12.14	8.51	23.50
Spectr 5	62.11	10.68	7.76	19.45
Average	55.99	12.27	8.62	23.12



Region 2	O	Fe	Ni	La
Spectr 1	50.43	13.41	9.78	26.38
Spectr 2	53.24	13.18	9.00	24.58
Spectr 3	53.87	12.84	9.27	24.02
Spectr 4	60.80	11.14	7.76	20.30
Spectr 5	57.20	12.05	8.30	22.45
Average	55.11	12.52	8.82	23.55



Region 3	O	Fe	Ni	La
Spectr 1	57.61	11.84	8.37	22.18
Spectr 2	46.57	14.46	10.49	28.48
Spectr 3	58.86	11.60	7.84	21.70
Спектр 4	48.70	13.95	10.20	27.14
Spectr 5	52.31	13.08	9.67	24.94
Average	52.81	12.99	9.31	24.89

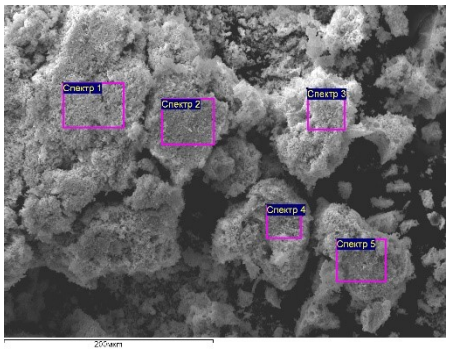
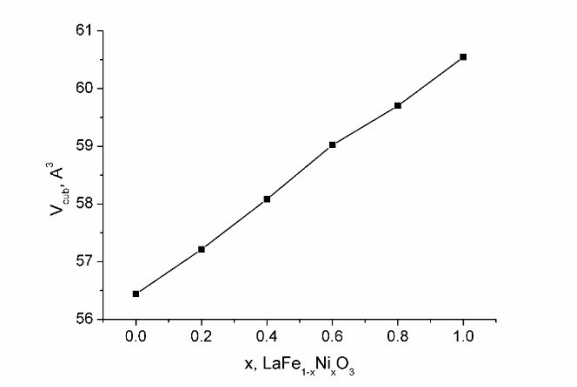


Table. EDX data on average atomic content in the samples

Sample	Average atomic content O	Fe	Ni	La	Fe/Ni
LaFe0.8Ni0.2O3	56.2	16.2	4.5	22.5	3.6
LaFe0.6Ni0.4O3	54.6	12.6	8.9	23.9	1.4
LaFe0.4Ni0.6O3	57.0	7.8	12.4	22.8	0.6

S2. Volume of unit cell versus Ni content in $LaFe_{1-x}NixO_3$ perovskites



S3. TEM data for $LaFe_{0.2}Ni_{0.8}O_3$