

Different Stages of Phase Transformation in the Synthesis of Nanocrystalline Sr-Hexaferrite Powder Prepared by a Gaseous Heat Treatment and Re-Calcination Method

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Table S1. Phase percentages in the samples obtained by CH₄ heat treatment at different temperatures

Temperature (°C)	SrFe ₁₂ O ₁₉ (mole)	Sr ₇ Fe ₁₀ O ₂₂ (mole)	Fe ₂ O ₃ (mole)	Fe ₃ O ₄ (mole)	FeO (mole)	Fe (mole)	Fe ₃ C (mole)
450	98.20	0.00	1.60	0.00	0.00	0.00	0.00
550	96.76	0.35	1.86	0.92	0.00	0.00	0.00
650	36.13	12.58	44.56	6.26	0.00	0.00	0.00
750	1.92	19.64	49.62	19.74	1.53	0.00	4.83
850	0.12	19.99	34.13	0.89	0.00	0.00	33.50
950	0.12	18.61	2.49	2.75	0.66	13.50	41.27
1050	0.00	16.54	5.92	4.35	0.01	43.78	6.44

Table S2. Amount of different phases in the samples obtained by CH₄ heat treatment at different temperatures (normalized on the basis of supposing that the initial amount of Fe in the sample has been 100 moles)

Temperature (°C)	SrFe ₁₂ O ₁₉ (mole)	Sr ₇ Fe ₁₀ O ₂₂ (mole)	Fe ₂ O ₃ (mole)	Fe ₃ O ₄ (mole)	FeO (mole)	Fe (mole)	Fe ₃ C (mole)
450	8.18	0.00	0.88	0.00	0.00	0.00	0.00
550	8.06	0.02	1.03	0.35	0.00	0.00	0.00
650	3.01	0.73	24.68	2.39	0.00	0.00	0.00
750	0.16	1.14	27.48	7.54	1.88	0.00	2.38
850	0.01	1.16	18.90	0.34	0.00	0.00	16.50
950	0.01	1.08	1.38	1.05	0.81	21.38	20.33
1050	0.00	0.96	3.28	1.66	0.01	69.33	3.17

Table S3. Phase percentage in the samples gas heat treated and re-calcined at different temperatures

Temperature (°C)	SrFe ₁₂ O ₁₉ (mole)	Sr ₇ Fe ₁₀ O ₂₂ (mole)	Fe ₂ O ₃ (mole)	Fe ₃ O ₄ (mole)	FeO (mole)	Fe (mole)
200	0.12	19.81	10.13	6.18	0.60	43.74
300	0.00	19.81	6.55	7.96	0.40	45.26
400	0.00	18.78	10.87	16.52	1.70	35.41
500	0.96	17.23	49.36	19.90	0.00	7.32
600	0.00	17.40	79.03	2.02	0.00	0.00
700	16.81	15.85	66.77	0.00	0.00	0.00
800	26.89	15.00	58.03	0.08	0.00	0.00
900	51.02	10.85	38.55	0.00	0.00	0.00
1000	90.28	1.72	7.90	0.03	0.00	0.00
1100	93.40	1.03	2.35	3.01	0.00	0.00
1200	99.16	0.00	0.76	0.00	0.00	0.00

Table S4. The amount of different phases in the samples gas heat treated and re-calcined at different temperatures (normalized on the basis of supposing that the initial amount of Fe in the sample has been 100 moles)

Temperature (°C)	SrFe ₁₂ O ₁₉ (mole)	Sr ₇ Fe ₁₀ O ₂₂ (mole)	Fe ₂ O ₃ (mole)	Fe ₃ O ₄ (mole)	FeO (mole)	Fe (mole)
200	0.01	1.15	5.61	2.36	0.74	69.27
300	0.00	1.15	3.63	3.04	0.49	71.67
400	0.00	1.09	6.02	6.31	2.09	56.08
500	0.08	1.00	27.34	7.60	0.00	11.59
600	0.00	1.01	43.77	0.77	0.00	0.00
700	1.40	0.92	36.98	0.00	0.00	0.01
800	2.24	0.87	32.14	0.03	0.00	0.00
900	4.25	0.63	21.35	0.00	0.00	0.00
1000	7.52	0.10	4.37	0.01	0.00	0.00
1100	7.78	0.06	1.30	1.15	0.00	0.00
1200	8.26	0.00	0.42	0.00	0.00	0.00