Supplementary Materials

FILE S1:

Details of the measurement conditions used in the analytical methods developed at the Centre of Analytical Chemistry Łukasiewicz—IMN for the determination of elements in ferrosilicon magnesium alloys.

1. Inductively Coupled Plasma Optical Emission Spectrometry (ICP-OES)

Determination of Mg, Al, Ca, Ce, La, Ti, Cr, Mn, Ba and P using Ultima 2 ICP-OES spectrometer from Horiba Yobin-Yvon (Lyon, France)

Selected analytical lines

Element	Analytical line length λ [nm]
Mg	285.213
Al	396.152
Ca	422.673
Ce	413.380
La	333.749
Ba	455.403
Ti	336.121
Cr	205.552
Mn	257.610
P	178.229

Measurement parameters

Generator power	1100 W
Argon plasma flow	15 l/min
Argon flow through the nebulizer	0,8 l/min
Shielding argon flow	0,2 l/min
Sample flow	1,0 ml/min
Nebulizer	Teflon, MIRA MIST
Spray Chamber	Teflon, cyclonic
Injector	Alumina 2 mm

Determination of Mg, Al, Ca, Ce, La, Ti, Cr, Mn, Ba and P using a 5300V ICP-OES spectrometer from Perkin Elmer (Cracow, Poland)

Selected analytical lines

Element	Analytical line length λ [nm]
Fe	259.939
Ca	393.366
Si	288.158
Ni	231.604
Al	394.401
Mn	259.372
Ti	334.940
Mg	285.213
P	178.221
Cu	324.752

Cr	267.716
Ce	413,764
La	408.672

Measurement parameters

Generator power	1300 W
Argon plasma flow	15 l/min
Argon flow through the nebulizer	0,8 l/min
Shielding argon flow	0,2 l/min
Sample flow	1,5ml/min
Nebulizer	Gem Cone
Spray Chamber	Scotta (Ryton)
Injector	Alumina 2 mm

2. X-ray Fluorescence Spectrometry (XRF)

Determination of Si and Fe using Axios Max WDXRF spectrometer equipped with a 4kW rhodium anode tube from Mal-vern Panalytical (Malvern, United Kingdom)

Samples prepared in the form of pellets

Measurement parameters

Parameters	Element	
	Fe	Si
Analytical line	Kα	Kα
Crystal	LiF 200	PE 002
Filter	Al 750 μm	–
Dtector type	scintillation	flow
Tube parameters	60 kV 66 mA	25 kV 160 mA
Measurement time	20 s	20 s

Determination of Fe, Mg, Ca, Ce, La, and Mn using Axios Max WDXRF spectrometer equipped with a 4kW rhodium anode tube from Mal-vern Panalytical (Malvern, United Kingdom)

Samples prepared in the form of borate beads

Measurement parameters

Parameters	Element							
	Fe	Mg	Ca	Ce	La	Mn	Sr	Sr1
Analytical line	Kα	Kα	Kα	Lα	Lα	Kα	Kα	Lα
Crystal	LiF 200	PX1	LiF 200	LiF 200	LiF 200	LiF 200	LiF 200	PE 002
Filter	–	–	–	–	–	–	Al 750 μm	–
Dtector type	scintillation	flow	flow	flow	flow	flow	scintillation	flow
Tube parameters	60 kV 66 mA	25 kV 160 mA	30 kV 133 mA	50 kV 80 mA	50 kV 80 mA	60 kV 66 mA	60 kV 66 mA	25 kV 160 mA
Measurement time	12 s	30 s	30 s	30 s	30 s	30 s	12 s	30

3. Flame Atomic Absorption Spectrometry (FAAS)

Determination of Mg, Al, Ca, Cr, and Mn using a CE 3300 AAS-FAAS (Thermo Scientific, Dreieich, Germany)

Measurement parameters

	Al	Mg	Ca	Mn	Cr
Analytical line length λ [nm]	309.3	285.2	422.7	279.5	357.9
lamp current [mA]	10	6	6	12	12
background correction	turned on	turned on	turned on	turned on	turned on
slot width [nm]	0.5	0.5	0.5	0.2	0.5
type of flame	N_2O-C_2H_2	N_2O-C_2H_2	N_2O-C_2H_2	air-C_2H_2	N_2O-C_2H_2
burner length [cm]	5	5	5	10	5
acetylene flow [l/min]	4.2	3.9	4.2	1.0	4.2
burner height [mm]	11	7	11	7	8
Measurement time [s]	3	3	3	3	3
the number of repetitions	3	3	3	3	3