



Łukasiewicz
Institute
of Non-Ferrous
Metals



Certified
Reference
Materials

New Certified Reference Materials (CRM) intended for quality control of raw materials and products of silicon and electronic devices industry. Our offer contains one set of CRMs for each strategy material including: silicon metal, ferrosilicon magnesium and silica fume.

Our Certified Reference Materials are compliant with the requirements of the **ISO 17034**.

The standards are included in the scope of **Łukasiewicz – IMN** accreditation granted by the Polish Center of Accreditation under the registration number **RM 006**.



RM 006

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Chemical Composition of Certified Reference Materials Ferrosilicon magnesium

	Si-FSM-1	Si-FSM-2	Si-FSM-3	Si-FSM-4
Si	(48.34 ± 0.75)%	(44.41 ± 0.82)%	(45.50 ± 0.78)%	(44.94 ± 0.99)%
Fe	(42.21 ± 0.44)%	(41.57 ± 0.38)%	(48.91 ± 0.26)%	(44.13 ± 0.54)%
Mg	(3.41 ± 0.20)%	(7.33 ± 0.29)%	(2.414 ± 0.099)%	(5.65 ± 0.22)%
Al	(0.400 ± 0.025)%	(0.627 ± 0.032)%	(0.713 ± 0.027)%	(0.649 ± 0.041)%
Ca	(0.871 ± 0.033)%	(2.86 ± 0.12)%	(0.293 ± 0.023)%	(2.00 ± 0.12)%
Ce	(0.484 ± 0.013)%	(0.492 ± 0.020)%	(0.208 ± 0.011)%	(0.401 ± 0.027)%
La	(0.2477 ± 0.0078)%	(0.280 ± 0.011)%	(0.1082 ± 0.0050)%	(0.226 ± 0.017)%
Ba	(0.1401 ± 0.0064)%	(53.3 ± 4.7) mg/kg	(33.2 ± 3.6) mg/kg	(49.4 ± 3.9) mg/kg
Ti	(0.0380 ± 0.0030)%	(0.0449 ± 0.0028)%	(0.0672 ± 0.0017)%	(0.0512 ± 0.0028)%
Cr	(0.0799 ± 0.0029)%	(0.0287 ± 0.0018)%	(0.0730 ± 0.0029)%	(0.0442 ± 0.0024)%
Mn	(0.488 ± 0.016)%	(0.440 ± 0.021)%	(0.2509 ± 0.0062)%	(0.375 ± 0.017)%
P	(0.0116 ± 0.0022)%	(0.0162 ± 0.0029)%	(0.0143 ± 0.0034)%	(0.0172 ± 0.0039)%

Silica fume

	Si-SF-1	Si-SF-2	Si-SF-3
Si	(45.67 ± 0.34)%	(43.35 ± 0.24)%	(40.15 ± 0.57)%
Fe	(0.0503 ± 0.0026)%	(1.639 ± 0.063)%	(4.69 ± 0.16)%
Al	(0.110 ± 0.012)%	(0.364 ± 0.020)%	(0.450 ± 0.021)%
Ca	(0.1968 ± 0.0056)%	(0.270 ± 0.011)%	(0.2594 ± 0.0080)%
Na	(0.1487 ± 0.0070)%	(0.3399 ± 0.0046)%	(0.540 ± 0.017)%
K	(0.2546 ± 0.0083)%	(0.782 ± 0.013)%	(1.410 ± 0.027)%
Mg	(0.136 ± 0.010)%	(0.382 ± 0.014)%	(0.835 ± 0.029)%
Cl	(0.0188 ± 0.0011)%	(0.0103 ± 0.0015)%	(0.0520 ± 0.0028)%
P	(0.01349 ± 0.00083)%	(0.0116 ± 0.0013)%	(0.02227 ± 0.00076)%
S	(0.0980 ± 0.0048)%	(0.2707 ± 0.0076)%	(0.3718 ± 0.0088)%
Zn	(30.9 ± 3.2) mg/kg	(0.0160 ± 0.0014)%	(0.0540 ± 0.0018)%
C	(0.566 ± 0.036)%	(1.333 ± 0.093)%	(1.372 ± 0.098)%
LOI (EN-196-2)	(1.03 ± 0.18)%	(2.37 ± 0.31)%	(2.22 ± 0.39)%

Silicon

	Si-1	Si-2
Fe	(1.102 ± 0.043)%	(0.391 ± 0.014)%
Al	(0.270 ± 0.012)%	(0.182 ± 0.014)%
Ca	(0.0750 ± 0.0031)%	(0.0618 ± 0.0024)%
Ti	(0.0295 ± 0.0020)%	(0.0310 ± 0.0039)%
Cr	(33.1 ± 3.5) mg/kg	(22.5 ± 4.3) mg/kg
Ni	(9.0 ± 1.5) mg/kg	(10.7 ± 2.4) mg/kg
V	(22.2 ± 3.0) mg/kg	(12.6 ± 2.3) mg/kg
Mn	(0.0237 ± 0.0016)%	(47.1 ± 4.2) mg/kg
Cu	(20.5 ± 2.5) mg/kg	(25.0 ± 4.7) mg/kg
P	(53.8 ± 3.1) mg/kg	(19.3 ± 1.5) mg/kg
B	(111.7 ± 1.7) mg/kg	(43.8 ± 3.5) mg/kg
C	(0.0432 ± 0.0066)%	(0.0439 ± 0.0068)%

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