

RFA Ringversuch Central Geological Laboratory of Mongolia - CGL-206 - MBTB, Iron Concentrate

Veranstalter des Ringversuchs: Central Geological Laboratory of Mongolia (CGL)

Ringversuchsmaterial: CGL 206 (MBTB, Iron Concentrate)

RV geschlossen: 2017 - 3

Literatur: Reference Material Certificate CGL

Hauptelemente [MA%]

	CRB	RV	1sRV	Z-Score
SiO ₂	5,990	5,860	0,570	0,230
TiO ₂	0,086	0,080	0,010	0,640
Al ₂ O ₃	1,280	1,250	0,080	0,310
Fe _{total}	51,000	50,890	0,910	0,140
MnO	0,123	0,110	0,010	1,280
MgO	4,980	4,930	0,160	0,300
CaO	5,850	5,870	0,170	-0,120
K ₂ O	0,240	0,240	0,020	0,040
P ₂ O ₅	0,050	0,050	0,000	0,080

Spurenelemente [µg/g]

	CRB	RV	1sRV	Z-Score
As*	30,00	27,00		
Ba*	21,00	25,00		
Co	82,00	91,00	7,00	-1,18
Cr*	20,00	20,00		
Cu	518,00	418,00	57,00	1,77
Ni	97,00	114,00	19,00	-0,94
Pb	55,00	45,00	7,00	1,65
Sr	16,00	22,00	3,00	-1,92
V	191,00	266,00	39,00	-1,92
Zn	779,00	703,00	40,00	1,90

Legende

CRB: Ergebnisse CRB – **RV:** Ergebnisse Ringversuch -- **1s-RV:** Standardabweichung Ringversuch

Z-Score: Differenz des Messwertes vom Mittelwert des Ringversuchs -- * Wert nicht zertifiziert



**MONGOLIA
CENTRAL GEOLOGICAL LABORATORY**



**REFERENCE MATERIAL CERTIFICATE
(Certified reference material)**

**CGL 206
MBTB (IRON CONCENTRATE)**

Certified values

No	Oxide/element	Unit	CV ¹	U _{CRM} ²	N ³
1	SiO ₂	% m/m	5.86	0.57	11
2	TiO ₂	% m/m	0.08	0.01	12
3	Al ₂ O ₃	% m/m	1.25	0.08	13
4	Fe _{total}	% m/m	50.87	0.91	14
5	MnO	% m/m	0.11	0.01	14
6	MgO	% m/m	4.93	0.16	10
7	CaO	% m/m	5.87	0.17	11
8	K ₂ O	% m/m	0.24	0.02	10
9	P ₂ O ₅	% m/m	0.048	0.003	10
10	Co	mg/kg	90.56	7.16	13
11	Cu	mg/kg	418.1	56.6	13
12	Ni	mg/kg	114.3	18.7	13
13	Pb	mg/kg	44.46	6.50	10
14	Sr	mg/kg	22.38	3.36	10
15	V	mg/kg	265.5	38.9	12
16	Zn	mg/kg	703.2	39.9	13

¹ Certified value (CV) – based on a minimum of 10 results with a minimum of 2 independent methods

² Estimated expanded uncertainty (U_{CRM}) - with a coverage factor k=2, corresponding to a level of confidence of about 95 %, as defined in ISO/IEC GUIDE 98-3:2008 "Uncertainty of measurement Part 3: Guide to the Expression of Uncertainty in Measurement (GUM:1995)"

³ Number of datasets (N)

Additional Information

N ^o	Oxide/element	Unit	IV ^d	N ³
1	Na ₂ O	% m/m	0.10	7
2	S _{total}	% m/m	2.60	6
3	LOI*	% m/m	4.59	8
4	As	mg/kg	27.0	9
5	Ba	mg/kg	25.1	10
6	Cr	mg/kg	20.2	9
7	La	mg/kg	2.9	5

^d Indicative value (IV) – one certification criteria is not fulfilled

*LOI - Loss on Ignition (analysed by 1000°C)

Intended uses of this Certified Reference Material (CRM)

Based on defined metrological characteristics-metrological traceability of assigned property values and associated measurement uncertainties also physical characteristics – homogeneity and small particle size, this CRM is suitable for method development, calibration, validation and quality assurance, quality control purposes when analyzing samples that are matrix- matched to this material.

Description of sample

The starting material, a bulk of iron concentrate was collected from the “Bayangol” deposit, at Eruu sum, Selenge province, Mongolia. This product is separated using dry magnetic separator.

The mineral composition of the material has been determined to be:

N ^o	Minerals	Percentage (% m/m)
1	Magnetite	70
2	Dolomite	15
3	Serpentin	6
4	Biotite	3
5	Talc	5
6	Clinopyroxene	} 1
7	Hornblende	
8	Sphalerite	
9	Chalcopyrite	
10	Pyrite	
11	Pyrrhotite	
12	Quartz	

Sample preparation

The preparation, homogeneity and stability testing were performed by the CGL laboratories in 2013 – 2015.

After crushing and pulverization, the entire batch of selected bulk material passed a sieve with an opening of 0.075 mm of an ultrasonic sieving machine.

The pulverized bulk material was homogenized by a high performance intensive mixer.

After testing the homogeneity, portions of 100 g reference material each were bottled by rotary splitting from this batch to polyethylene bottles and labeled.

Homogeneity of material

Within and between bottles homogeneity testing was performed under repeatability condition, using 10 samples randomly selected. Homogeneity test result confirmed that material is sufficiently homogeneous.

Certification

An interlaboratory approach with 13 participating laboratories was selected to obtain a reliable base of data for assignment of the certified values. A nested design was chosen for maximum information output.

The traceability was established to the existing CRM – Iron ore NCS DC11010 produced at China National Analysis Center for Iron and Steel.

Production and evaluation procedures for compliance with the valid ISO – Guides were assessed and certified by a Scientific and Technical Council of CGL.

Instructions for Storage and Use

The CRM should be stored at room temperature and tightly sealed to protect it from absorption of atmospheric moisture, direct sun reflection and laboratory chemicals. The material can be transported by any kind of transport means.

To overcome segregation effect due to storage or transportation, the material should be shaken appropriately before opening the bottle.

No material that had once been removed from the original sample bottle should be returned to it, as that might cause contamination of the remaining sample.

Certified values and information values are reported on a dry weight basis (105°C, 2 h).

The recommended minimum sample test portion mass is 250 mg. If a test method requires a test portion less than 250 mg, it is recommended that an excess of the CRM (>150 mg) is further pulverized in an agate mortar, before weighing out the needed mass.

Material safety data sheet for this CRM is attached to this certificate.

Period of validity

This material is considered to be stable. Therefore, this certificate shall remain valid through 2026, unless users are otherwise notified.

The stability of the material will be monitored regularly for duration of an inventory.

Availability of Material

This certified reference material will be classified as **CGL 206** in accordance with CGL CRM classification system. It is available from the Producer:

Central Geological Laboratory
CGL-building
Trade Union Street
Songinokhairkhan District
P.O.Box - 437
18080 Ulaanbaatar
MONGOLIA

Tel.: + (976) 70180101, 70182914
Fax: + (976) 70184212, 70182564
E-mail: info@cengeolab.com
cengeolab@mbox.mn
Web: www.cengeolab.com

Customer Feedback

Customers, using this CRM are kindly requested to register at the Central Geological Laboratory. This opens the opportunity to notify the user community on any new development with regard to this CRM. Customer feedback with respect to any information included in this certificate is highly appreciated.

Test methods applied for this certification

Al ₂ O ₃	XRF (10), ICP- OES/AES (3)	Na ₂ O	XRF (5), ICP- OES/AES (2)
As	XRF (6), ICP- OES/AES (3)	Ni	XRF (4), ICP-MS (1), ICP- OES/AES (8)
Ba	XRF (3), ICP-MS (1), ICP- OES/AES (6)	P ₂ O ₅	XRF (9), SPM(1)
CaO	XRF (10), ICP- OES/AES (1)	Pb	XRF (4), ICP-MS (1), ICP- OES/AES (5)
Co	XRF (5), ICP-MS (1), ICP- OES/AES (7)	S	XRF (4), GRAV (1), IR (1)
Cr	XRF (5), ICP-MS (1), ICP- OES/AES (3)	SiO ₂	XRF (9), SPM (2)
Cu	XRF (6), ICP-MS (1), ICP- OES/AES (6)	Sr	XRF (4), ICP-MS (1), ICP- OES/AES (5)
Fe ₂ O ₃ ᠮᠠᠨᠢᠨᠠ	XRF (10), ICP- OES/AES (2), TITR (2)	TiO ₂	XRF (7), ICP-MS (1), ICP- OES/AES (3), SPM(1)
K ₂ O	XRF (9), ICP- OES/AES (1)	V	XRF (6), ICP-MS (1), ICP- OES/AES (5)
La	ICP-MS (1), ICP- OES/AES (4)	Y	XRF (1), ICP-MS (1), ICP- OES/AES (3)
MgO	XRF (9), TITR (1)	Zn	XRF (5), ICP-MS (1), ICP- OES/AES (7)
MnO	XRF (9), ICP- OES/AES (4), AAS(1)	ᠯᠢᠬᠡ	GRAV (8)

Abbreviations:

- XRF - energy/wavelength dispersive x-ray fluorescence spectroscopy
- ICP- MS - inductively coupled plasma - mass spectrometry
- ICP-OES/AES - inductively coupled plasma-optic/atomic emission spectroscopy
- AAS - atomic absorption spectroscopy
- SPM - spectrophotometry
- TITR - titrimetry
- IR - Infrared spectroscopy
- GRAV - gravimetry

Participating Laboratories

- 1 Central Geological Laboratory, Ulaanbaatar, Mongolia
- 2 ALS Group LLC, Ulaanbaatar, Mongolia
- 3 ALS Loughrea, Ireland
- 4 ALS Minerals-Vancouver, Canada
- 5 Geoscience Laboratories, Ontario, Canada
- 6 Eurotest Control EAD, Sofia, Bulgaria
- 7 Institute de Tecnologia Ceramica (ITC), Castelló, Spain
- 8 Irgiredmet OAO – Irkutsk research institute of precious and rare metals and diamonds, Irkutsk, Russia
- 9 BGR-Federal Institute for Geosciences and Natural Resources, Hannover, Germany
- 10 Dillinger Hütte GTS The chemical laboratories of Dillinger Hüttenwerke, Germany
- 11 CRB Analyse Service GmbH, Germany
- 12 Geochemistry-Metallogeny, France
- 13 KhanLab LLC, Ulaanbaatar, Mongolia

Legal notice

Based on the decision of Scientific and Technical Council of Central Geological Laboratory on 2 November 2016, by a resolution No ... of director of CGL, this material had been approved as a Certified Reference Material with a code number CGL 206 Iron concentrate.

**DIRECTOR OF CENTRAL
GEOLOGICAL LABORATORY**

U.OYUNBAATAR

