

MONGOLIA
CENTRAL GEOLOGICAL LABORATORY



CERTIFICATE OF ANALYSIS

Certified Reference Materials “EAu-1”, “EAu-2”

Gold ore “CGL 117”

Certified values (CV) and their confidence interval ($\pm\Delta_A$)

No.	Oxides/ Elements	Unit	CV	$\pm\Delta_A$	N
1.	SiO ₂	%	84.70	0.84	32
2.	TiO ₂	%	0.17	0.02	25
3.	Al ₂ O ₃	%	4.79	0.10	32
4.	Fe ₂ O ₃ (total)	%	2.18	0.15	34
5.	CaO	%	2.53	0.14	32
6.	MgO	%	0.37	0.04	28
7.	MnO	%	0.017	0.002	26
8.	Na ₂ O	%	0.055	0.025	22
9.	K ₂ O	%	1.48	0.09	24
10.	P ₂ O ₅	%	0.125	0.027	24
11.	H ₂ O ⁺	%	0.10	0.02	13
12.	Loss on ignition	%	2.84	0.10	18
13.	Au	mg/kg	0.79	0.02	25
14.	Ag	mg/kg	1.70	0.42	14
15.	Sb	%	0.14	0.02	20
16.	Zn	%	0.0025	0.0006	16
17.	Cu	mg/kg	14.84	3.86	15
18.	Pb	%	0.002	0.001	17
19.	As	%	0.12	0.02	15

Gold ore “CGL 118”

Certified values (CV) and their confidence interval ($\pm\Delta_A$)

No.	Oxides/ Elements	Unit	CV	$\pm\Delta_A$	N
1.	Au	mg/kg	0.57	0.04	26
2.	Ag	mg/kg	1.25	0.16	13

Classification criteria

CV – certified value satisfying certification criteria

Description of the sample

The material is a reference material taken from the gold ore of the Onon balj, Bulgan deposit Khentii in the area of Mongolia. The material consists of a homogeneous powder (particles have passed a sieve with apertures smaller than 63 μm).

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

Minerals	Percentage, % m/m
Quartz	71.4
Sericite feldspar	8.5
Muscovite-sericite	14.7
Chlorite-biotite	1.2
Hydrogeotite	2.1
Calcite	1.5
Dolomite, pidote, spen, zircon, tourmaline, apatite, rutile, antimonite, valentinite, leucosene, pyrite, cinnabar, magnetite, ilmenite, goethite, realgar, arsenopyrite, bismuth, orpiment, gold	0.6

Instructions for Storage and Use

The recommended minimum sample intake is 20 g for gold, 5 g for silver and 100 mg for other elements. If there is a need of sample intake below 100 mg for an analytical method (i.e. the optic emission spectrometry), weigh more than 100 mg and mix in an agate mortar. Then weigh necessary weight.

Taken portions should not be poured back in a bottle as it may contaminate the material.

The reference material is stored in a polyethylene bottle of 100 g. The bottle should be stored preferably in a dry place at the room temperature, protected from an effect of chemical reagents.

The reference material can be transported by any kind of transport means.

Validity of the Certificate

Duration of production is 1998-2001. Duration of use is 20 years.

Availability of Material

These reference materials will be classified as "CGL 117", "CGL 118" in the future in accordance with CGL CRM classification system.

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Participating Laboratories

Preparation, homogeneity and stability testing:

Central Geological Laboratory

Certification analyses:

- Laboratory of Methodology, Control and Standardization of the Central Geological Laboratory, Ulaanbaatar, Mongolia
- Chemistry Laboratory of the Central Geological Laboratory, Ulaanbaatar, Mongolia
- Laboratory of the physical methods of the Central Geological Laboratory, Ulaanbaatar, Mongolia
- BGR, RFA-Laboratory, Hannover Germany
- Genalysis laboratory service PTY. Ltd., Australia
- "Analabs" Pty Ltd., Australia
- "Analabs" Pty Ltd., Mongolia office, Ulaanbaatar
- Alex Stuart Ltd (ASSAYERS), England
- Laboratory Geological Investigations Ltd., Bulgaria
- Korean Atomic Energy research Institute, Taejon, Korea
- IRGIREDMET, Irkutsk, Russia
- Germany, Bundesanstalt für Materialforschung und -prüfung, BAM
- XRAL, Canada
- Geoscience Laboratories, Ontario, Canada
- Chemical and Technological Centre for New Materials, Mongolian State University, Ulaanbaatar, Mongolia
- Institute for Physics and Techniques of the Academy of Science, Ulaanbaatar, Mongolia
- Chemistry Laboratory of the Faculty of Natural Science, Mongolian State University, Ulaanbaatar, Mongolia
- Chemical Institute of the Academy of Science, Ulaanbaatar, Mongolia
- Research-Scientific Laboratory of the Institute for Medicine, Ulaanbaatar, Mongolia
- Chemistry Laboratory of the Mongolian-Soviet joint venture "Erdenet" concentrator, Erdenet, Mongolia
- Exploitation and Investigation Center of technology of mineral resources, Ulaanbaatar, Mongolia

- Chemistry Laboratory of the Cement factory, Hutul, Mongolia
- Construction and Architecture company, Laboratory of Chemical connection of building material investigation physics section Ulaanbaatar, Mongolia

Methods used

Methods of final determination were:

-X-ray fluorescence spectrometry	SiO ₂ , TiO ₂ , Fe ₂ O ₃ , CaO, MgO, MnO, Na ₂ O, K ₂ O, P ₂ O ₃ , SO ₃ , Cu, Zn, Pb, As, Sb
-Atomic absorption spectrometry	Al ₂ O ₃ , Fe ₂ O ₃ , CaO, MgO, MnO, Na ₂ O, K ₂ O, Pb, Au, Ag, Sb, Zn, Cu, As
-photometry, spectral-photometry	SiO ₂ , Al ₂ O ₃ , TiO ₂ , P ₂ O ₃ , MnO
-fire assaying-AAS	Au, Ag
-ICP-AES spectrometry	SiO ₂ , TiO ₂ , Al ₂ O ₃ , Fe ₂ O ₃ , CaO, MgO, MnO, Na ₂ O, SO ₃ , Au, Ag, Zn, Cr ₂ O ₃ , Co, V
-gravimetric	SiO ₂ , SO ₃ , H ₂ O, LoI, Au
-volumetric	Al ₂ O ₃ , Fe ₂ O ₃ , FeO, CaO, MgO, CO ₂ , SO ₃ , Zn
-flame photometry	Na ₂ O, K ₂ O

Certification

The reference materials were confirmed and given a numbers a USZ 34-2002, USZ 35-2002 by the National Center for Standardization and Metrology.

Note

A detailed technical report on the analysis procedure and the treatment of the analytical data is supplied with each sample.