

**CENTRAL GEOLOGICAL LABORATORY**

**CERTIFIED REFERENCE MATERIAL**

**CERTIFICATE OF ANALYSIS**

<b>USZ 21-98, USZ 22-98, USZ 23-98</b>						
<b>Gold ore “ZB-2”,</b>						
<b>Tailings of the gold ore floatation</b>						
<b>“OBH Au”, “TsBH Au”</b>						
Symbol of reference material	Mass fraction (based on dry mass at 105 <sup>o</sup> C) of elements				Number of accepted sets of results	
	Certified value <sup>(1)</sup> expressed as $\mu\text{g.g}^{-1}$		95% confidence interval <sup>(2)</sup> expressed as $\mu\text{g.g}^{-1}$		p	
	Au	Ag	Au	Ag	Au	Ag
ZB-2	1.06	-	0.16	-	16	-
OBH Au	3.70	-	0.28	-	27	-
TsBH Au	10.72	21.48	0.78	0.807	22	10

<sup>(1)</sup> This value is the unweighted mean of p accepted sets of results.  
<sup>(2)</sup> The 95% confidence interval is a measure of the uncertainty and is acceptable when the reference material is used for calibration purposes.

**DESCRIPTION OF THE SAMPLE**

The “ZB-2” is a reference material taken from the gold basic deposit in the Zaamar-Bumbat area of Mongolia. The “OBH Au” is a reference material taken from the enrichment tailings of samples from gold basic ore deposit in the Olon Ovoot area of Mongolia. The “TsBH Au” is a reference material taken from the enrichment tailings of samples from gold basic ore deposit in the Tsagaan tolgoi area of Mongolia. The materials consist of a homogeneous powder (particles have passed a sieve with apertures smaller than 63  $\mu\text{m}$ ). The materials contain the following minerals:

Minerals	Mass fraction expressed as $\text{cg.g}^{-1}$		
	ZB-2	OBH Au	TsBH Au
Quartz	92.4	49.3	89.1
Feldspar	3.6	17.3	4.8
Sericite-muscovite	0.7	12.8	0.6
Hydrous ferric oxide	0.9	9.2	2.6
Calcite		2.0	1.4
Dolomite	1.1	7.5	-
Chlorite, epidite, anglesite, cerussite, sphe, apatite, pyrite, chalcopyrite	1.3	-	-
Biotite, chlorite, epidite, sydirite, ilmenite, magnetite	-	-	0.7
Chlorite	-	1.0	-
Biotite, turmaline, apatite, fluorite, sphe, ilmenite	-	1.0	-
Gold	few particles	few particles	few particles

The materials contain following gold particle size approximate distribution:

Particle size expressed as $\mu\text{m}$	Mass fraction expressed as $\text{cg.g}^{-1}$		
	ZB-2	OBH Au	TsBH Au
3-5	24.37	25.31	27.62
5-9	31.98	27.93	38.12
9-12	13.20	13.599	13.81
12-15	11.67	13.34	12.16
15-25	18.78	19.83	8.299

Additional information is presented in the Annex.

## INSTRUCTION FOR USE, STORAGE AND TRANSPORTATION

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, then weigh more than 100 mg and mix in an agate mortar.

Taken portions have not been poured back in 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 kin of transport means.

Date of production is December, 1996. Duration of use is 10 years.

## PARTICIPATING LABORATORIES

### Preparation; homogeneity and stability testing:

- Central Geological Laboratory

### Certification analyses:

- Chemistry sub-laboratory of the Central Geological Laboratory, Ministry of Agriculture and Industry, Ulaanbaatar, Mongolia
- Sub-laboratory of Technology and Experiment of the Central Geological Laboratory, Ministry of Agriculture and Industry, Ulaanbaatar, Mongolia
- Sub-laboratory of Methodology, Control, Standardization and Metrology of the Central Geological Laboratory, Ministry of Agriculture and Industry, Ulaanbaatar, Mongolia
- Research-scientific laboratory of the Institute for Medicine, Ulaanbaatar, Mongolia
- Institute for Physics and Techniques of the Academy of Science, Ulaanbaatar, Mongolia
- Chemistry institute of the Academy of Science, Ulaanbaatar, Mongolia
- National institute for Standardization and Metrology, Ulaanbaatar, Mongolia
- Scientific-production Company □Erdes□, Ulaanbaatar, Mongolia
- Chemistry Laboratory of the Mongolian-Russian joint venture "Erdenet" Corporation, Erdenet, Mongolia
- Geological and Exploration □Gurvan gol□ Co., Ltd, Ulaanbaatar, Mongolia
- Amdel Laboratories Ltd, Australia
- Federal Institute for Geoscience and Natural Resources, Germany
- Dunn Analytical, Mongolia Ltd
- □Ansto□ firm, Australia
- Institute for Geochemistry SO RAN, Irkutsk, Russia
- Irkutsky State Institute for rare metals, Irkutsk, Russia
- Geochemical Analytical Center, Canada

## METHODS USED

Methods of final determination were:

- photometry (Au)
- flame atomic absorption spectrometry (Au)
- flameless atomic absorption spectrometry (Au)
- scintillation emission spectrometry (Au, Ag)
- fire assaying (Au, Ag)
- fire assaying □AAS (Au, Ag)
- X-ray fluorescence spectrometry (Au, Ag)
- ICP spectrometry (Au, Ag)

## NOTE

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

## ANNEX

Additional information (not certified) on various contents is presented here. The data are mean values of various sets of results obtained by various techniques in various laboratories.

Symbol of the reference material	Ag	Number of individual sets
	Mass fraction expressed as $\mu\text{g}\cdot\text{g}^{-1}$	
ZB-2 OBH Au	1.12 0.68	