

National Institute of Advanced Industrial Science and Technology (AIST)

Geological Survey of Japan

Certified Geochemical Reference Material

GSJ CRM JSO-1 Soil (Black forest soil)

Geochemical Reference Material Technical Information

Intended uses for this CRM are control of the precision of analysis or confirmation of the validity of analytical methods or instruments for analysis of main or trace components in soils or similar samples.

Certified Value

Component	Certified Value (mass fraction %)	Analytical Method (<i>vide infra</i>)
SiO ₂	38.28 ± 0.27	1
TiO ₂	1.23 ± 0.01	2
Al ₂ O ₃	17.99 ± 0.06	2
total Fe ₂ O ₃	11.49 ± 0.07	2, 3, 4
MnO	0.202 ± 0.003	2, 3
MgO	2.11 ± 0.01	2, 3
CaO	2.56 ± 0.05	2, 3
Na ₂ O	0.66 ± 0.01	2, 3
K ₂ O	0.34 ± 0.01	2, 3
P ₂ O ₅	0.48 ± 0.02	2, 5

after ± value is expanded uncertainty.

Information Value

Component	Information Value (mass fraction %)	Analytical Method (<i>vide infra</i>)
FeO	2.45 ± 0.12	4

Component	Information Value (mg/kg)	Analytical Method (<i>vide infra</i>)	Component	Information Value (mg/kg)	Analytical Method (<i>vide infra</i>)
B	12	2	Pb	13	6
Ba	267, 271	2, 2	Rb	14.5	7
Co	32	6	Sr	196, 195	2, 2
Cr	71	2	V	300	2
Cs	1.5	7	Y	24.9	2
Cu	169	6	Zn	105	6
Li	11.2	3	Zr	96	2
Ni	39	6			

The analytical value of other components (including the above-mentioned components) is opened sequentially on the GSJ geochemical reference materials web page.

<https://gbank.gsj.jp/geostandards/>

Analytical Method

- 1) Gravimetry and one method of spectrophotometry, ICP-AES and AAS
- 2) ICP atomic emission spectrometry (ICP-AES)
- 3) Flame atomic absorption spectrometry (AAS)
- 4) Potassium dichromate titration
- 5) Spectrophotometry
- 6) Solvent extraction flameless atomic absorption spectrometry
- 7) Flame emission spectrometry

Decomposition Method

The decomposition method mainly used was as follows.

SiO₂ : Sodium carbonate fusion

FeO : Sulfuric acid – hydrofluoric acid decomposition

Others : Nitric acid – perchloric acid – hydrofluoric acid decomposition

Traceability

Traceability of this CRM was ensured by using a balance calibrated according to JCSS (Japan Calibration Service System), and standard solutions prepared according to JIS (Japanese Industrial Standard) and JCSS.

Method of Characterization

The values of CRM were determined by interlaboratory testing by 8 collaborating organizations and 2 laboratories in the Geological Survey of Japan/AIST. After some data were rejected by statistical treatments, certified values and uncertainties were obtained from the averages of the analytical results and 95% confidence intervals respectively.

Precautions for Use

As the moisture content of this CRM is relatively high, the CRM should be used after drying at 105–115 °C for 2 hours.

From the point of homogeneity, it is recommended to use more than 100 mg at each analysis.

Notes for Storage

The CRM should be stored at room temperature without direct sunshine and high humidity. After unsealed, the CRM should be stored in a bottle with a tightly fixed inner lid.

Preparation Method

Locality : Black forest soil sample was collected in Machida-city, Tokyo, Japan.

Sample processing : Sampled soil was roughly crushed with a jaw-crusher, and powdered in a ball-mill. The powder was screened with a 246 μ m sieve, homogenized, and approximately 100 g of the powder were put in each glass bottle.

Homogeneity

Ten bottles were randomly sampled from the products. And each 100mg of 2 samples from each bottle were analyzed by AAS for several chemical components. The results showed good homogeneity.

Expiration of Certification

The expiration date of this sample is not especially provided. However, it notifies the customer when the alteration not anticipated happens, and the change is caused in the certified value.

Measurement Laboratory

Geological Survey of Japan/AIST

Dowa Techno Research Co.,Ltd.

KAWAJU TECHNO SERVICE CORPORATION

Kurita Analysis Service Co.,Ltd.

Mitsubishi Materials Techno Corporation

Mitsui Chemical Analysis & Consulting Service Inc.

NIPPON STEEL TECHNO RESEARCH

Shimadzu Techno-Research Inc.

Sumitomo Metal Technology Inc.

Note : This paper is a translation of the original Japanese certificate and is not an official document.

If you have any questions about this CRM, please contact

National Institute of Advanced Industrial Science and Technology (AIST)
Geological Survey of Japan (GSJ)

Geochemistry Group, Institute of Geology and Geoinformation
AIST Tsukuba Central 7, 1-1-1, Higashi, Tsukuba, Ibaraki 305-8567, Japan