



United States Geological Survey Certificate of Analysis

Basalt, Hawaiian Volcanic Observatory, BHVO-2

Material used in the preparation of BHVO-2 was taken from the surface layer of the pahoehoe lava that overflowed from the Halemaumau crater in the fall of 1919. This is the same location used to provide material for BHVO-1. Collection of BHVO-2 was accomplished in 1995 under the direction of Carl Thornberg, USGS. Details of the collection, preparation, and testing are available (Wilson, S.A., 1998).

Element concentrations were determined in a round robin study involving 20 international laboratories. Recommended values are listed when analytical results provided by three independent laboratories using a minimum of three independent analytical procedures are in statistical agreement. Information values with standard deviations are listed when at least two independent laboratories using two independent analytical procedures have provided information. Information values without standard deviations represent information from a single laboratory or analytical procedure.

Recommended values

Element	Wt %	±	Oxide	Wt %	±
Al	7.16	0.08	Al ₂ O ₃	13.5	0.2
Ca	8.17	0.12	CaO	11.4	0.2
Fe _{TOT}	8.63	0.14	Fe ₂ O ₃ _{TOT}	12.3	0.2
K	0.43	0.01	K ₂ O	0.52	0.01
Mg	4.36	0.07	MgO	7.23	0.12
Na	1.64	0.06	Na ₂ O	2.22	0.08
P	0.12	0.01	P ₂ O ₅	0.27	0.02
Si	23.3	0.3	SiO ₂	49.9	0.6
Ti	1.63	0.02	TiO ₂	2.73	0.04
Element	µg/g	±	Element	µg/g	±
Ba	130	13	Nd	25.0	1.8
Ce	38	2	Ni	119	7
Co	45	3	Rb	9.8	1.0
Cr	280	19	Sc	32	1
Cu	127	7	Sr	389	23
Ga	21.7	0.9	V	317	11
Hf	4.1	0.3	Y	26	2
La	15	1	Zn	103	6
Mn	1290	40	Zr	172	11

Information values

Element	$\mu\text{g/g}$	\pm	Element	$\mu\text{g/g}$	\pm
F	370		Sm	6.2	0.4
Gd	6.3	0.2	Sn	1.9	
Ho	1.04	0.04	Ta	1.4	
Li	5		Tb	0.9	
Lu	0.28	0.01	Th	1.2	0.3
Nb	18	2	Yb	2.0	0.2

Bibliography

Wilson, S.A., 1997, Data compilation for USGS reference material BHVO-2, Hawaiian Basalt, U.S. Geological Survey Open-File Report xxxxx.

Glossary

Wt %	Percent of total element concentration
$\mu\text{g/g}$	Total element concentration expressed as micrograms of element per gram of solid sample
\pm	One standard deviation

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Ordering Information

USGS reference materials (RMs) may be obtained directly from Dr. Stephen A. Wilson at the address or numbers listed below. The price for each bottle of RM is \$80.00 (U.S.) **except** DGPM-1 which is \$175.00 (U.S.). This cost includes all shipping and handling charges using normal mail delivery. Urgent requests for RMs should be initiated by FAX or e-mail. If required, overnight delivery is available with these charges added to the final bill.

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URL: http://minerals.cr.usgs.gov/geo_chem_stand/basaltbhvo2.pdf