



United States Geological Survey Certificate of Analysis

Basalt, Columbia River, BCR-2

Material used in the preparation of BCR-2 was collected in 1996, from the Bridal Veil Flow Quarry under the direction of Stephen A. Wilson, U.S. Geological Survey. The quarry, located approximately 29 miles east of Portland, Oregon is the same collection site used to provide material for BCR-1.

Element concentrations were determined in a round-robin study involving 20 international laboratories. Recommended total element concentrations are reported 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 provided when two or more independent laboratories using at least 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	7.14	0.10	Al ₂ O ₃	13.5	0.2
Ca	5.09	0.08	CaO	7.12	0.11
Fe _{tot}	9.65	0.15	Fe ₂ O _{3 tot}	13.8	0.2
K	1.49	0.04	K ₂ O	1.79	0.05
Mg	2.16	0.03	MgO	3.59	0.05
Na	2.34	0.08	Na ₂ O	3.16	0.11
P	0.15	0.01	P ₂ O ₅	0.35	0.02
Si	25.3	0.4	SiO ₂	54.1	0.8
Ti	1.35	0.03	TiO ₂	2.26	0.05

Element	µg/g	±	Element	µg/g	±
Ba	683	28	Rb	48	2
Ce	53	2	Sc	33	2
Co	37	3	Sr	346	14
Cr	18	2	Th	6.2	0.7
Eu	2.0	0.1	U	1.69	0.19
Ga	23	2	V	416	14
Gd	6.8	0.3	Y	37	2
La	25	1	Yb	3.5	0.2
Mn	1520	60	Zn	127	9
Mo	248	17	Zr	188	16
Nd	28	2			

Information values

Element	µg/g	±	Element	µg/g	±
Cs	1.1	0.1	Lu	0.51	0.02
Cu	19	2	Pb	11	2
F	440		Pr	6.8	0.3
Hf	4.8	0.2	Sm	6.7	0.3
Ho	1.33	0.06	Tb	1.07	0.04
Li	9	2	Tm	0.54	

Element	Isotopic Ratios	±	N
Pb ²⁰⁶ / ₂₀₄	18.750	0.011	1
Pb ²⁰⁷ / ₂₀₄	15.615	0.003	1
Pb ²⁰⁸ / ₂₀₄	38.691	0.021	1

Bibliography

Wilson, S.A., 1997, The collection, preparation and testing of USGS reference material BCR-2, Columbia River, Basalt, U.S. Geological Survey Open-File Report 98-00x.

Glossary

Wt %	Percent of total element concentration
µg/g	Total element concentration expressed as micrograms of element per gram of solid sample
±-	One standard deviation
N	Number of labs reporting

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Dr. Geoff Plumlee
U.S. Geological Survey
Central Region Mineral Team

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.

Dr. Stephen A. Wilson
U.S. Geological Survey
Box 25046, MS 964
Denver, CO 80225

Tel: 303-236-2454
FAX: 303-236-3200 or 303-236-1425
e-mail: swilson@usgs.gov

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