



U.S. Geological Survey Geochemical Reference Materials and Certificates

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U.S. Geological Survey Certificate of Analysis

Rhyolite, Glass Mountain, RGM-1

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The rhyolite, from Glass Mountain, Siskiyou County, California, was collected from a single block of massive obsidian near the terminal front of a Holocene obsidian flow. The sample is classified as a rhyolite on the basis of its high silica and total alkali contents, and it is assigned to the calc-alkali series because of its high CaO to total iron ratio.

The concentrations were determined by cooperating laboratories using a variety of analytical methods. Values reported are derived from international data compilations (Abbey, 1983, Gladney and Roelandts, 1988, Govindaraju, 1994). Initial USGS reports (Flanagan, 1976) provide background information on this material.

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Recommended Values

Oxide	Wt %	±	Oxide	Wt %	±
SiO ₂	73.4	0.53	MnO	0.036	0.004
Al ₂ O ₃	13.7	0.19	Na ₂ O	4.07	0.15
Fe ₂ O ₃	0.50	0.01	K ₂ O	4.30	0.10
FeO	1.27	0.05	TiO ₂	0.27	0.02
Fe ₂ O ₃ T	1.86	0.03	CaO	1.15	0.07
			MgO	0.28	0.03

Element	µg/g	±	Element	µg/g	±	Element	µg/g	±
Ag	0.11	0.008	Eu	0.66	0.08	Sb	1.3	0.1
As	3.0	0.4	F	340	30	Sc	4.4	0.3
B	28	3	Ga	15	2	Sm	4.3	0.3
Ba	810	46	Gd	3.7	0.4	Sn	4.1	0.4
Be	2.4	0.2	La	24	1.1	Sr	110	10
Br	1.3	0.1	Li	57	8	Ta	0.95	0.1

Ce	47	4	Lu	0.4	0.03	Th	15	1.3
Cl	510	50	Mn	280	30	U	5.8	0.5
Co	2.0	0.2	Mo	2.3	0.5	V	13	2
Cs	9.6	0.6	Nb	8.9	0.6	W	1.5	0.18
Cu	12	1.4	Nd	19	1	Yb	2.6	0.3
Dy	4.1	0.1	Pb	24	3	Zr	220	20
			Rb	150	8			

Element	µg/g	Element	µg/g	Element	µg/g
Cr	3.7	Y	25	Zn	32

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Certificate Information

Denver, Colorado
revised March 1995

David B. Smith
Central Region Mineral Resources Team (formerly Branch of Geochemistry)

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Bibliography

Abbey, S., 1983, Studies in "Standard Samples" of Silicate Rocks and Minerals 1969-1982: Canadian Geological Survey Paper 83-15, p. 114.

Flanagan, F.J., 1976, Descriptions and Analyses of Eight New USGS Rock Standards: U.S. Geological Survey Professional Paper 840, 192 p.

Gladney, E.S., and Roelandts, I., 1988, 1987 Compilation of Elemental Concentration Data for USGS BHVO-1, MAG-1, QLO-1, RGM-1, SCo-1, SDC-1, SGR-1, and STM-1: Geostandards Newsletter, 12:253-362.

Govindaraju, K., 1994, 1994 Compilation of Working Values and Descriptions for 383 Geostandards: Geostandards Newsletter, 18:1-158.

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Glossary

Symbol	Definition
Fe ₂ O ₃ T	Total iron expressed as Fe ₂ O ₃

C _{tot}	Total carbon concentration
S _{tot}	Total sulfur concentration
Wt %	Percent of total element concentration
µg/g	Total element concentration expressed as micrograms of element per gram of solid sample
±	One standard deviation

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Notes

Unless otherwise indicated total element concentrations are reported for material on an as-received basis, i.e., no drying.

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