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Development of the Spectrographic 30-Element Geochem Analysis

By

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DEVELOPMENT OF THE SPECTROGRAPHIC 30-ELEMENT GEOCHEM ANALYSIS

The semi-quantitative spectrographic geochemical analysis is developed to a point where we believe we can begin to make the analyses on our samples. We have no independent way of analysing, except for a few elements by AAS, and so our method of checking the validity of the analysis consists of comparing our results to those of "accepted values" on two U.S.G.S. rock standards.

The "accepted values" are the averages of numerous quantitative analyses for the various elements by various methods in several U.S.G.S. laboratories. In some cases the range from which the averages are calculated is considerable, even 100% of the reported values.

The comparisons follow:

ELEMENT OR OXIDE	G 2 STANDARD		G SP-1 STANDARD	
	G.S. AV. VALUE	D.M.G. VALUE	G.S. AV. VALUE	D.M.G. VALUE
Fe_2O_3	2.76%	3%	4.33%	7%
CaO	1.98%	1.5%	2.03%	1.5%
MgO	0.78%	0.5%	0.95%	1%
TiO_2	0.5%	0.3%	0.69%	0.3%
Nb	16 ppm	10 ppm	28 ppm	50 ppm
W	0.4 ppm	N	0.5 ppm	N
Sb	0.05 ppm	N	2.8 ppm	N
As	<30 ppm	N	<30 ppm	N
Au	1 ppb	N	1.3 ppb	N
Cr	9 ppm	L5	13 ppm	75
Sr	463	300	463	300
Co	5	L10	6.4	7
Ni	6.4	5	7.5	15
Sc	4	N	9.2	10

ELEMENT OR OXIDE	G 2 STANDARD		G SP-1 STANDARD	
	G.S. AV. VALUE	D.M.G. VALUE	G.S. AV. VALUE	D.M.G. VALUE
Zn	75	N	143	N
La	112	50	280	300
Y	12	N	36.6	30
Ag	0.048	N	0.07	N
Zr	316	200	544	1000+
Cu	10.7	5	35.2	50
Cd	0.01	N	0.016	N
Sn	1	N	6.5	L10
Mo	1.2	N	1.2	N
Be	2.4	1		
V	37	15	52	100
Bi	<0.5	N	<0.5	N
Mn	265	200	326	500
Pb	28.7	50	52.4	75
B	2	N	0.7	N
Ba	1950	1000	1360	1500

For the most part the comparisons give us confidence that the procedure is usable.

To date 26 of our own geochem samples have been analyzed by the spectrographic procedure. The comparison between the spectrographic and the AAS values for Cu, Pb, Zn, and Ni are shown on the following page. The two sets of values are essentially comparable. The generally higher Ni values reported by the spectrographic procedure are expected because the AAS procedure does not dissolve all the silicate Ni.

SAMPLE NO.	Cu		Pb		Zn		Ni	
	Spec	AAS	Spec	AAS	Spec	AAS	Spec	AAS
9L 1)	50	40	L10	15	L200	50	75	35
3)	100	90	30	30	L200	40	75	75
18)	50	55	20	60	L200	65	50	55
25)	20	25	N	10	L200	40	10	40
45)	100	70	20	20	300	325	75	35
49)	300	215	N	20	L200	90	50	25
8)	50	40	N	15	N	50	100	40
14)	75	65	N	25	N	75	75	45
30)	100	75	N	15	N	115	75	30
40)	150	120	20	20	500	210	50	30
9J 1)	7	10	20	10	N	35	20	
5)	30	20	100	40	N	55	50	
10)	30	20	30	25	N	90	50	
15)	75	40	20	25	N	110	100	
20)	50	25	20	15	N	95	75	
25)	7	10	30	10	N	40	50	
30)	10	10	20	15	N	45	50	
35)	15	15	20	20	N	35	50	
40)	20	20	20	20	N	85	75	
45)	10	15	20	20	N	70	50	
9J50)	15	15	20	10	N	60	75	
55)	7	5	20	10	N	35	15	
60)	10	5	30	15	N	45	20	
65)	7	5	30	10	N	35	20	
70)	10	10	30	10	N	40	30	
75)	5	10	20	10	N	30	20	