

17. 14-MeV NEUTRON ACTIVATION ANALYSIS OF SELECTED LEG 5 CORE SAMPLES

W. E. Kuykendall, Jr., Buren W. Hoffman and R. E. Wainerdi
Activation Analysis Research Laboratory, Texas A&M University
College Station, Texas

SAMPLE PREPARATION

Each core sample was first crushed and mixed to permit packaging in small polyethylene vials. Where sample size permitted, two subsamples weighing approximately 1 gram each were taken at random from the core sample, weighed and placed in vials which were then heat sealed. Standards containing known amounts of oxygen, silicon, iron, magnesium, potassium and aluminum were weighed and capsulated. Samples of the U.S.G.S. standard rock G-2, BCR-1 and GSP-1 were weighed and capsulated in a similar manner.

ANALYTICAL PROCEDURES

Each sample and standard was irradiated with 14-MeV neutrons for two minutes, counted for two and ten minutes after cooling times of ten minutes and two hours, respectively. A Cockcroft-Walton type neutron generator provided a fast neutron flux of approximately 1×10^8 n/an²/sec at the sample during irradiation. A pneumatic sample transfer system was used to carry each sample and standard to the irradiation terminal and then to a 3 inch \times 3 inch sodium-iodide (T1)

detector, which was coupled to a 400 channel pulse height analyzer. KRIS, a weighted least-squares computer program, processes the punched-tape data from the pulse height analyzer to resolve the radioactivity from the activation products of silicon, aluminum, iron, magnesium and potassium, and also to compute the amount of each element present. A goodness-of-fit parameter is computed for each unknown sample, and it serves as an indication of the reliability of the final results.

Oxygen content was determined by a separate procedure which consists of five short irradiations and counts under standardized conditions. The observed activity is then compared to that of oxygen standards by a computer program, written to facilitate the quantitative calculations and to provide an error estimate.

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Major Element Composition of Selected Samples from Leg 5

Sample Designation				Composition, Wt %					
Hole	Core	Section	Sampled at (cm)	O	Si	Fe	Al	Mg	K
32	4	4	76	50.63 ± 1.57	29.38 ± 0.29	4.28 ± 0.20	7.22 ± 0.16	1.23 ± 0.24	6.47 ± 1.12
32	10	2	120	45.67 ± 2.51	26.11 ± 0.27	6.33 ± 0.22	7.31 ± 0.15	3.42 ± 0.26	5.21 ± 1.07
33	4	5	20	48.31 ± 2.71	28.02 ± 0.30	4.93 ± 0.21	7.74 ± 0.16	2.18 ± 0.26	4.77 ± 1.14
33	10	5	100	49.14 ± 1.49	24.93 ± 0.20	4.34 ± 0.14	5.54 ± 0.10	1.83 ± 0.17	4.73 ± 0.75
34	3	1	90	47.68 ± 0.90	17.10 ± 0.16	3.12 ± 0.11	4.87 ± 0.09	1.36 ± 0.14	4.91 ± 0.62
34	10	5	20	49.57 ± 5.06	26.70 ± 0.26	3.85 ± 0.17	5.05 ± 0.13	1.80 ± 0.21	4.71 ± 0.94
35	2	6	69-71	42.93 ± 2.65	28.46 ± 0.40	5.44 ± 0.29	7.60 ± 0.22	2.73 ± 0.36	N.D.
35	14	4	70	43.87 ± 2.19	27.82 ± 0.50	6.84 ± 0.41	9.83 ± 0.29	3.00 ± 0.50	2.44 ± 1.99
36	1	5	52	44.75 ± 1.98	17.76 ± 0.29	4.40 ± 0.24	5.81 ± 0.17	1.74 ± 0.29	7.26 ± 1.26
36	6	2	60	47.25 ± 1.24	13.68 ± 0.18	3.05 ± 0.14	4.04 ± 0.10	1.52 ± 0.17	5.39 ± 0.75
36	12	6	95	45.38 ± 0.51	17.57 ± 0.23	4.74 ± 0.19	4.41 ± 0.13	2.04 ± 0.22	4.60 ± 0.93
37	1	3	70	47.23 ± 3.14	24.32 ± 0.57	4.46 ± 0.42	7.91 ± 0.32	1.51 ± 0.53	7.85 ± 2.36
37	4	5	40	45.80 ± 1.71	8.69 ± 0.29	27.85 ± 0.60	2.82 ± 0.19	1.02 ± 0.40	13.10 ± 1.80
38	2	6	70	49.23 ± 2.23	23.45 ± 0.32	5.82 ± 0.26	7.91 ± 0.19	1.61 ± 0.31	8.50 ± 1.37
38	6	4	80	46.78 ± 3.68	2.67 ± 0.19	13.86 ± 0.48	0.86 ± 0.13	0.76 ± 0.30	6.85 ± 1.33
39	1	4	70	54.34 ± 1.67	23.03 ± 0.35	5.97 ± 0.30	7.80 ± 0.20	3.51 ± 0.37	9.22 ± 1.53
40	1	3	20	49.77 ± 2.38	24.30 ± 0.30	8.54 ± 0.27	7.95 ± 0.17	1.25 ± 0.29	10.47 ± 1.29
41	1	2	70	48.25 ± 2.31	24.90 ± 0.24	4.90 ± 0.18	7.95 ± 0.14	1.62 ± 0.23	8.50 ± 1.01
42	10	2	70	54.04 ± 3.33	28.79 ± 0.76	2.08 ± 0.38	0.75 ± 0.28	0.78 ± 0.40	8.65 ± 2.48

N.D. = Not Detected