LITHOPHILE TRACE ELEMENTS IN APOLLO 17 SOILS. J.A. Philpotts, S.Schuhmann, C.W. Kouns and R.K.L. Lum, Planetology Branch, NASA/Goddard Space Flight Center, Greenbelt, MD 20771.

Li, K, Rb, Sr, Ba, rare-earth and Zr abundances in Apollo 17 soil samples (twenty), soil breccia, KREEP-breccia and mare-basalts (four) have been determined by mass-spectrometric isotope dilution. Results are reported in the table. Abundances of Rb and Yb, two of the more informative trace elements, are plotted in the figure. Most of the soils approximate two component mixtures with (high Yb) mare basalt, similar to trace-element depleted Apollo 11 basalt (e.g. 10062), as one end member. The "dark-mantle" soils 70181 and 71501 are highest in this component. The other component which shows some similarities to Apollo 16 soil, may have been introduced as an ejecta blanket. The "white-mantle" soils (72501, 73121 and 73141) may represent mixtures of KREEP and this component. It, or "white-mantle," may also be present in the relatively pure orange (74220) and black (74001) soils from Station 4. Other Station 4 soils approximate mixtures of "white-mantle" and local basalt. Variations of soil composition with depth appear relatively limited in the Station 4 drive tube, and the Station 2a and 8 trenches. Major element data (1, 2, 3) are consistent with these observations.

REFERENCES:

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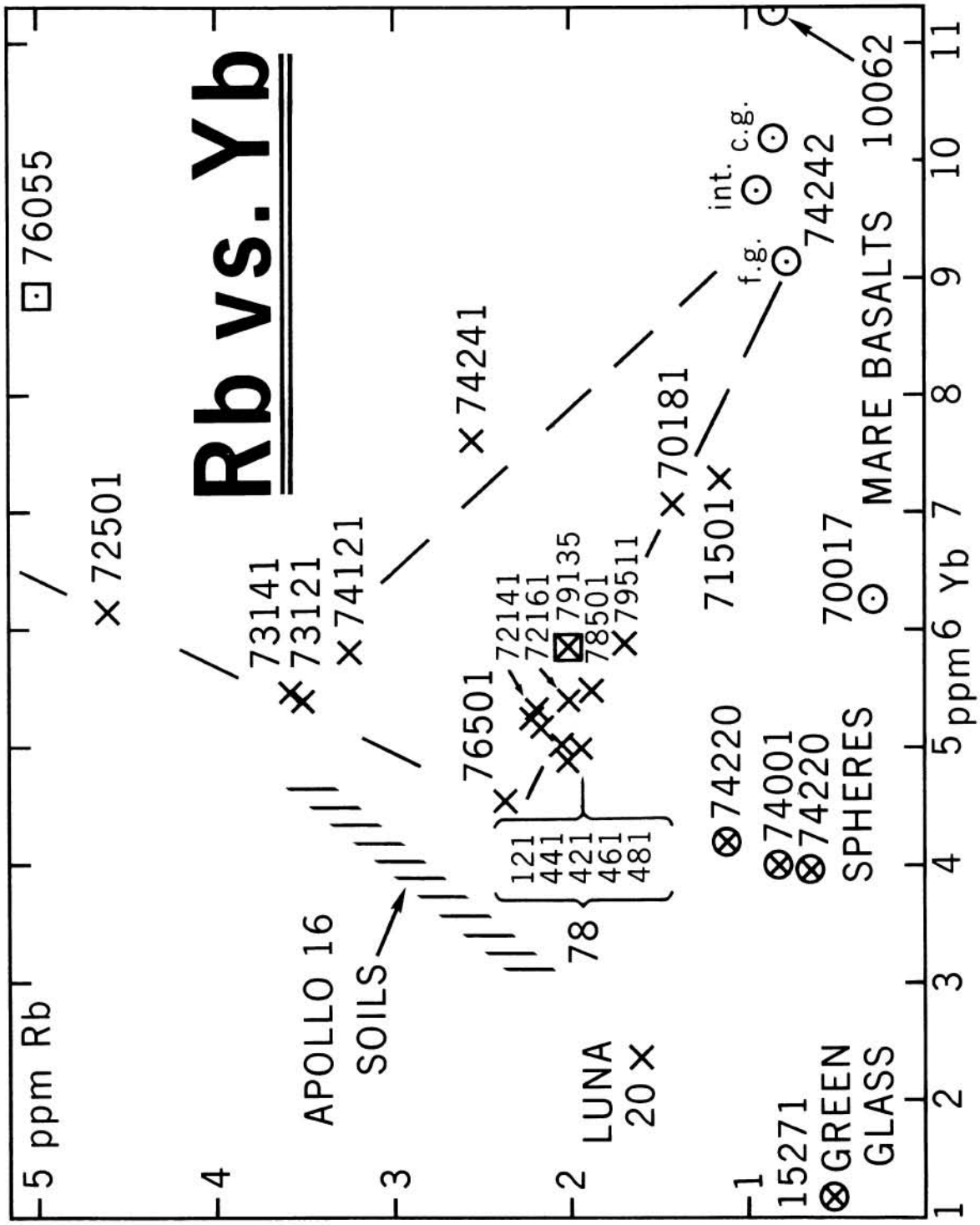

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	MARE BASALT				SOILS								
										Trench		Drive Tube	
	70017,23	74242,8			70181,15	71501,31	72141,19	72161,16	72501,30	73121,14	73141,18	74001,11	74121,16
	LM	f.g. STN4	int. STN4	c.g. STN4	LM	STN 1A	LRV 2	LRV 3	STN 2	∿1 cm STN 2A	∿15 cm STN 2A	∿40 cm STN 4	LRV 6
Li	8.57	8.83	9.59	9.26	9.85	8.63	9.33	9.17	11.9	9.91	9.82	11.8	10.3
K	307	534	609	525	696	602	843	835	1400	1160	1170	596	1130
Rb	.280	0.750	0.944	(0.851)	1.42	1.14	2.19	2.01	4.60	3.51	3.56	.814	3.24
Sr	168	161	168	148	167	156	154	155	155	144	147	203	150
Ba	43.0	76.6	78.7	65.4	104	86.0	120	115	211	171	171	73.8	167
Ce	10.7	21.5	23.3	-	24.4	21.5	27.7	25.7	-	38.1	37.7	18.4	39.0
Nd	12.1	23.8	25.8	23.5	22.0	20.7	20.7	20.5	27.8	24.8	24.8	17.8	25.6
Sm	5.13	9.55	10.6	9.04	8.18	8.02	6.69	6.84	8.18	7.14	7.00	6.61	7.55
Eu	1.62	1.87	1.97	1.85	1.71	1.67	1.41	1.45	1.38	1.26	1.24	1.86	1.33
Gd	-	13.6	14.9	13.8	11.0	10.7	8.66	9.13	9.74	8.75	8.15	8.52	-
Dy	10.2	16.6	19.2	16.8	13.1	13.3	9.73	9.99	11.0	9.65	9.39	9.01	10.4
Er	6.31	9.68	10.3	10.0	7.52	7.84	5.68	5.77	6.33	5.85	5.73	4.68	6.44
Yb	6.25	9.14	9.74	10.2	7.06	7.28	5.29	5.39	6.14	5.38	5.46	4.00	5.79
Lu	.954	1.35	1.51	1.62	1.07	1.11	0.819	0.837	0.929	-	0.825	0.617	0.895
Zr	223	309	489	-	338	224	191	206	288	238	235	223	213
wt in mg	117.34	48.63	41.73	9.6	120.40	91.28	122.89	132.14	98.75	203.90	96.61	73.80	90.43

	SOILS											SOIL BRECCIA	BRECCIA
	Trench					Trench							
	74220,40	74220,40	74241,20	76501,28	78121,10	78421,33	78441,14	78461,14	78481,30	78501,30	79511,13	79135,34	76055,3
	∿6 cm STN 4	spheroids STN 4	STN 4	STN 6	LRV 11	∿20 cm STN 8	∿10 cm STN 8	∿5 cm STN 8	∿1 cm STN 8	STN 8	STN 9	STN 9	STN 6
Li	11.4	10.8	10.3	8.83	9.29	8.58	8.89	8.90	8.96	9.13	9.22	10.6	13.5
K	647	532	1030	831	831	774	806	774	791	748	763	865	1850
Rb	1.11	0.644	2.55	2.36	2.22	2.04	2.15	2.01	1.94	1.87	1.70	1.99	5.00
Sr	206	205	155	150	154	152	149	149	150	153	164	171	154
Ba	78.4	73.9	116	116	113	112	113	109	111	102	103	123	291
Ce	19.9	17.7	29.6	23.4	25.2	24.4	24.2	23.2	23.4	24.1	23.6	29.2	65.5
Nd	17.9	17.4	24.8	17.3	19.2	18.5	18.6	17.6	17.8	18.0	20.0	21.7	42.1
Sm	6.50	6.40	8.80	5.60	6.26	5.96	6.08	5.88	5.91	6.34	7.00	7.51	12.0
Eu	1.84	1.83	1.64	1.26	1.39	1.35	1.35	1.31	1.35	1.42	1.56	1.64	1.81
Gd	8.46	8.50	12.2	-	-	8.04	8.04	7.79	8.58	8.31	9.73	-	-
Dy	9.16	8.82	14.0	8.12	9.84	9.14	9.18	8.88	9.01	9.89	10.9	11.7	16.0
Er	4.82	4.59	7.85	4.73	5.74	5.32	5.43	5.19	5.30	5.47	6.27	-	9.66
Yb	4.20	3.96	7.60	4.55	5.27	5.01	5.17	4.88	4.99	5.48	5.89	5.85	8.84
Lu	0.627	0.608	1.14	0.717	0.830	0.758	0.806	0.780	0.762	0.847	0.901	.792	1.37
Zr	184	194	565	180	188	171	196	166	202	179	224	-	399
wt	83.87	67.20	103.58	119.84	130.39	110.13	93.41	134.79	199.89	129.58	206.25	77.55	93.15