

Chemical Flux (Load)

Chemical flux or load varied among the rocks, both on an absolute basis, and as relative fraction of the total elemental content. HCS-IN leached chemicals most aggressively, while the blank MKSS-PA and KBF-WV were the least reactive rocks.

Fraction Leached

Table 8-3 shows the total elemental content and fraction leached for the five rocks. These data represent only the elemental fraction removed completely from the column. It does not account for materials that weathered and were retained in the column by the formation of other minerals, adsorption or exchange reactions. Four of five rocks leached about 0.001% or less of the Fe and Al present. Only the acidic leachate from sample HCS-IN contained appreciable quantities of Fe and Al. Less than 1% of total Mn was leached, except in sample HCS-IN where nearly 18% of Mn was removed. Between about 3 to almost 9% of total Ca was removed during the test and about 1 to 2 % of Mg was leached. For sulfur, initially present mostly as sulfides, about 2 to 4.5 % of total sulfur was removed during leaching. The trace element Se is in low concentrations (<3 ppm) in four of the five rocks, and less than one to about 7% of the total was removed during the test.

The rocks were ranked from most (1), to least (5) based on the fraction leached from the original content for each element. An overall average rank was computed from all parameters, and is shown in table 8-3. HCS-IN leached the most element fractions overall, while KBF-WV and MKSS-PA leached the least. As described in chapter 5, these rocks both contain more quartz and other less reactive minerals than the other three samples.

Table 8-3 Total Elemental Content and Relative Fraction Leached⁽¹⁾

Sample Element	BCS3-PA		HCS-IN		KBF-WV		LKFC-PA		MKSS-PA	
	Total ⁽²⁾ (%)	Leached Fraction	Total (%)	Leached Fraction	Total (%)	Leached Fraction	Total (%)	Leached Fraction	Total (%)	Leached Fraction
Fe	6.66	< 10 ⁻⁵	6.36	0.0015	6.14	< 10 ⁻⁵	7.74	10 ⁻⁵	2.25	<10 ⁻⁵
Mn	0.10	0.0009	0.04	0.18	0.10	0.0001	0.18	0.07	0.05	0.006
Al	10.83	< 10 ⁻⁵	6.66	3 x 10 ⁻⁴	8.49	<10 ⁻⁵	9.41	9x 10 ⁻⁵	5.89	3x 10 ⁻⁵
Ca	1.61	0.033	1.61	0.089	0.74	0.027	0.62	0.052	1.29	0.023
Mg	1.45	0.018	0.97	0.11	1.09	0.015	1.13	0.018	0.54	0.008
Na	0.18	0.012	0.37	0.032	0.55	0.0009	0.16	0.008	0.10	0.003
K	2.91	0.0007	2.28	0.0012	2.85	0.001	3.05	0.0009	1.99	0.001
S	0.53	0.035	5.54	0.045	0.20	0.024	0.81	0.043	0.09	0.021
Se	<3	0.021	81	0.11	<3	0.004	<3	0.068	<3	0.002
Zn	171	0.0055	456	0.088	126	0.0006	151	0.007	86	0.002
pH Week 1	7.12		6.61		7.19		5.45		7.20	
pH Week 14	7.14		3.24		7.18		6.27		7.16	
Average Rank	3.4		1		4.2		2.3		4.0	

(1) Median values of all columns, all labs.

(2) Se and Zn total concentrations are in ppm.