Standard	SiO2 WT%	TiO2 WT%	Al2O3 WT%	Fe2O3T WT%	MnO WT%	MgO WT%	CaO WT%	Na2O WT%	K2O WT%	P2O5 WT%	LOI WT%	H2O+ WT%
USGS Standards												
W-1	52.46	1.07	15	11.11	0.167	6.62	11	2.16	0.64	0.13		0.53
AGV-1	58.79	1.05	17.14	6.76	0.092	1.53	4.94	4.26	2.91	0.49	*(1.2*	0.78
DTS-1	40.37	*0.005*	*0.19*	8.68	0.121	49.58	0.17	0.015	0.001	*0.002*		*0.44*
G-2	69.08	0.48	15.38	2.66	0.032	0.75	1.96	4.08	4.48	0.14		0.51
GSP-1	67.15	0.65	15.1	4.29	0.04	0.96	2.07	*2.8*	5.51	0.28		0.53
PCC-1	41.67	*0.013*	0.67	8.25	0.119	43.43	0.52	*0.027*	0.007	*0.002*	*(5.12*	4.71
BHVO	49.94	2.71	13.8	12.23	0.168	7.23	11.4	2.26	0.52	0.273		*0.16*
RGM-1	73.45	0.267	13.72	*1.86*	0.036	0.275	1.15	4.07	4.3	*(.048*		*0.59*
SCo-1	62.78	0.628	13.67	5.14	0.053	2.72	2.62	0.9	2.77	0.206		*3.69*
SDC-1	65.85	1.01	15.75	6.9	0.114	1.69	1.4	2.05	3.28	0.158		1.81
SGR-1	28.24	0.264	6.52	3.03	0.034	4.44	8.38	2.99	1.66	*0.328*		
STM-1	59.64	0.135	18.39	5.22	0.22	0.101	1.09	8.94	4.28	0.158		1.5
BIR-1	47.77	0.96	15.35	11.26	0.171	9.68	13.24	1.75	*0.027*	*(.046*		*0.1*
DNC-1	47.04	0.48	18.3	9.93	0.149	10.05	11.27	1.87	0.229	*0.085*	*(.6*	0.68
SDO-1	49.28	0.71	12.27	9.34	0.042	1.54	1.05	0.38	3.35	0.11	21.7	
TTU IN-House Standards												
TMS	59.36	0.127	18.69	5.22	0.22	0.15	1.27	9.19	4.27	0.161	1.5	
RGMT	73.03	0.28	14.07	1.86	0.038	0.33	1.27	4.2	4.36	0.048	0.59	
MHA	60.49	0.84	17.89	5.93	0.095	3.16	6.16	4.33	1.25	0.174		
BCM	55.15	1.13	16.01	8.27	0.132	5.86	7.21	4	2.15	0.43		
ABA	45.13	2.03	14.51	11.91	0.18	11.42	10.36	3.16	1.41	0.44		
NUT	37.52	3.78	9.79	13.01	0.197	15.64	12.84	3.47	1.21	0.84		
GSPT	67.04	0.66	15.37	4.11	0.04	0.99	2.16	2.89	5.47	0.27	0.53	
GVA-1	58.81	1.04	17.33	6.63	0.09	1.62	5.25	4.32	2.95	0.51		

(information values

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recommended values

H2O- WT%	CO2 WT%	Fe2O3 WT%	FeO WT%	Ag ppb	As ppm	Au ppb	B ppm	Ba ppm	Be ppm	Bi ppb	Br ppm	C ppm
0.14	0.06	1.43	8.76	60	*2.2*	4.3	13	162	0.76	*48*	*0.36*	*160*
1.00	*0.03*	4.46	2.06	*78*	*880*	*0.62*	*7.8*	1226	2.1	*57*	*(.32*	*(90*
0.06	*0.08*	1.03	6.97	*(13*	*0.034*	*0.92*	*(.5*	*(.17*	*(.004*	*6*	*0.11*	*220*
0.11	*0.08*	1.07	1.46	*40*	*250*	1.03	*2.4*	1882	2.5	*37*	*(.2*	*230*
0.08	*0.11*	1.75	1.75	*86*	*0.01*	*1.4*	*1.3*	1310	*1.4*	39	*(.52*	*310*
0.44	*0.15*	*2.72*	5.06	*(8*	*56*	*0.79*	*1.7*	*(1.2*	*(.05*	*8*	*0.44*	*420*
0.05	*(.036*	2.82	8.58	55	*(.4*	*1.6*	*2.5*	139	*1.1*	*18*	*(.71*	*98*
0.11	*0.014*	0.5	1.27	108	3	*(.33*	28	807	2.37	274	1.34	(38
2.11	*(2.97*	4.19	*0.9*	134	12.4	*2.1*	72	570	1.84	*370*	*(1.03*	*0.81%*
0.1	*0.1*	2.62	3.93	*41*	0.22	*1.2*	*12.8*	630	3	*260*	*(.097*	*270*
(0.45	11.58	*(1.46*	*(1.41*		67	*8.9*	54	290	1.06	940		3.16%
0.19	*0.026*	2.87	2.09	79	*4.6*	*(.4*	*6.4*	560	9.6	*130*	*(2.3*	*(70*
0.07	*(.02*	2.08	8.38	*(36*	*(.4*	*(1.6*	*(.33*	*7.7*	*0.58*	*(20*		*66*
0.33	*(.040*	1.76	7.39	(27	(.2	(2	*0.9*	114	*1*	*(20*		*(125*
	1.01				68.5		*128*	397	3.3			9.95%
		0.19			4.1			550.9				
		0.11			3.3			791.6				
					1.1			311.3				
					1			896.1				
					0.6			418.5				
		0.02			1.6			604.5				
		0.08			0.9			1278.6				
					1.1			1147.3				

Cd ppb	Ce ppm	Cl ppm	Co ppm	Cr ppm	Cs ppm	Cu ppm	Dy ppm	Er ppm	Eu ppm	F ppm	Ga ppm	Gd ppm
150	23.5	*205*	47	119	0.96	113	3.99	2.3	1.12	220	17.4	4.01
69	67	119	15.3	10.1	1.28	60	3.6	*1.7*	1.64	425	20	5
(10	*0.072*	*10.5*	137	3990	*0.0058*	*7.1*	*(.003*	*(.004*	*0.0012*	*13*	*(.5*	*(.0038*
16	160	*70*	4.6	*8.7*	1.34	*11*	2.4	*0.92*	1.4	1280	23	*4.3*
58	399	330	6.6	*13*	1.02	33	5.5	*2.7*	2.33	3630	23	12.1
19	*0.1*	*71*	112	2730	0.0055	*10*	*0.01*	*(.012*	*0.0018*	*(12*	*(.7*	*(.014*
69	39	92	45	289	*(.13*	136	5.2	2.4	2.06	385	21	6.4
65	47	510	2	*3.7*	9.6	11.6	4.08	2.6	0.66	342	15	3.7
140	62	*51*	10.5	68	7.8	28.7	4.2	2.5	1.19	770	*15*	*4.6*
(80	93	*32*	17.9	64	4	30	6.7	*4.1*	1.71	595	21.2	7.2
930	36	*(32*	11.8	30	5.2	66	*1.9*	1.11	*0.56*	1960	*11*	*2*
270	259	460	*0.9*	*(4.3*	1.54	*(4.6*	8.1	4.2	3.6	910	36	9.5
114	*(2.5*	*26*	51.4	382	*0.45*	126	2.4	*1.8*	0.54	*44*	*16*	*1.9*
(182	*10.6*	*37*	54.7	285	*(.34*	96	*2.7*	2	0.59	*66*	*15*	*2*
	79.3		46.8	*66.4*	*6.9*	*60.2*	*5.7*		*1.6*		16.8	*6.5*
	252.5		17.8	1.3		1.9					33	
	50.2		3.3	0.3		9					15.4	
	37.5		28.2	29		20.8					20.9	
	73.6		52	129.7		53.8					18.9	
	60.5		70.2	361.9		57					18.4	
	93.9		79.7	486.3		54.8					18.6	
	308.5		8.7	9.7		25.2					22	
	73.8		18	16.1		54.7					20.5	

Ge ppm	Hf ppm	Hg ppb	Ho ppm	I ppb	In ppb	Ir ppb	La ppm	Li ppm	Lu ppm	Mo ppm	N ppm	Nb ppm
1.65	2.5	200	0.81	*(54*	64	*0.3*	11	12.8	*0.317*	*0.75*	*(23*	9.9
1.25	5.1	*20*	0.67	*270*	*41*	*(.2*	38	12	0.27	2.7	*38*	*15*
0.88	*0.015*	*(7*	*(.0013*	*(120*	2.4	*0.69*	*0.029*	2.1	*2.4ppb*	*(.14*	20	*(2.2*
1.14	7.9	*51*	*0.4*	*(310*	*32*	*0.04*	89	34	*0.11*	*(1.1*	34	*12*
1.36	15.5	*(22*	1.01	*(80*	52	*0.3*	184	31	*0.214*	*(.8*	*36*	27.9
0.94	*(.04*	*(6*	*0.0025*	*(185*	*3.7*	*4.8*	*0.052*	*1.6*	*5.7ppb*	*(2*	44	*(1*
(1.64	4.38	*(5.6*	*0.99*		*(180*	*(.44*	15.8	*4.6*	0.291	1.02	*(23*	19
(1.3	6.2	*(22*	*0.95*		*(150*		24	57	0.41	2.3		8.9
(1	4.6	*(52*	0.97		*(110*		29.5	45	0.34	1.37		*11*
(1.5	8.3	*(23*	*1.5*		*(120*		42	34	*0.53*	*(.25*		*18*
(1.6	1.39	*(313*	*0.38*		*(96*		20.3	*147*	*0.14*	35.1		*5.2*
(1.4	28	*(15*	*1.9*		*(120*		150	*32*	*0.6*	*5.2*		268
(1.5	0.58	*(7*	*0.5*			*(.15*	*0.88*	3.4	0.26	*(.5*		*2*
(1.3	1.01	*(6*	*0.62*			*(.5*	3.8	5.1	0.32	*(.7*		*3*
	4.7	*190*					38.5	28.6	0.52	134		11.4
							126					
							22					
							15.1					
							35.8					
							27.2					
							45.2					
							114					
							35.8					

Nd ppm	Ni ppm	Os ppb	Pb ppm	Pd ppb	Pr ppm	Pt ppb	Rb ppm	Re ppb	Rh ppb	Ru ppb	S ppm	Sb ppm
14.6	75	*(.2*	*7.5*	*14*	3.2	*13*	21.4	*(.49*		*0.2*	*130*	1.04
33	*16*		36	*2.2*	*7.6*	*(1.1*	67.3	*0.38*			*(26*	4.3
0.029	2360	*0.9*	*12*	*(3*	0.0063	*(3.1*	*0.058*	*(9.5*	0.83	*(2.5*	*12*	*0.5*
55	*(5*		30	*(.25*	*18*	*(5.9*	170				*(100*	0.07
196	*8.8*		55	*(1.2*	*52*		254				*320*	3.2
0.042	2380	*(7*	*10*	*5.4*	*0.013*	*8*	0.066	*(.058*	*1.4*	*10*	20	1.28
25.2	121		*2.6*	*3*	5.7	*(2*	11		*(.2*		102	*0.16*
19	*(4.4*		24	*(.2*	*4.7*		149				*(54*	1.26
26	27		31	*1*	*6.6*		112				*630*	2.5
40	*38*		25	*(1.1*	*9.8*	*(1*	127				*650*	0.54
15.5	*29*		38	*(5.2*	3.9	*(3*	83				1.53%	3.4
79	*(3*		17.7	*(0.4*	19		118				*(43*	1.66
2.5	166		*3.2*	*5.6*	*(.5*	*(2.8*	*(1*		*(.35*			*0.58*
4.9	247		*6.3*	*16*	*1.3*	*(36*	*(4.5*		*(.35*		*(392*	0.96
36.6	99.5		27.9				*126*				5.35%	

64.5							112.7					
16.6							146.9					
18	24.2						18.5					
22.5	85						31.4					
23.7	234.9						26.2					
41.7	391						30.6					
112	6.3						245.6					
24.6	15						69.3					

Sc ppm	Se ppm	Sm ppm	Sn ppm	Sr ppm	Ta ppm	Tb ppm	Te ppb	Th ppm	Tl ppm	Tm ppm	U ppm	V ppm
35	*0.118*	3.68	2.7	186	0.48	0.63	*(7.4*	2.4	0.114	*0.34*	0.57	257
12.2	*(.05*	5.9	*4.2*	662	0.9	0.7	*1.9*	6.5	*0.34*	*0.34*	1.92	121
3.5	*(5.7ppb*	*0.0046*	*0.55*	*0.32*	*0.039*	*0.0008*	*(3*	0.01	*0.0002*	*1.4ppb*	0.0036	*11*
3.5	*(.07*	7.2	*(1.8*	478	0.88	*0.48*	*(5*	24.7	*0.91*	*(.18*	2.07	36
6.2	*0.069*	26.3	6.6	234	0.97	1.34	*23*	106	1.43	0.38	2.54	53
8.4	*27ppb*	*0.0066*	*1.6*	0.4	*(.02*	*0.0015*	*(3.1*	*0.013*	*(.002*	*2.7ppb*	*0.0045*	31
31.8	*(74ppb*	6.2	*2.1*	403	1.23	0.96	*6.4*	1.08	*0.58*	0.33	0.42	317
4.4	*(6ppb*	4.3	4.1	108	0.95	0.66		15.1	*0.93*	0.37	5.8	13
10.8	0.89	5.3	*3.7*	174	92	0.7	*(77*	9.7	*0.72*	*0.42*	3	131
17	*32ppb*	8.2	3	183	1.21	1.18	*(6*	12.1	*0.7*	*0.65*	3.14	102
4.6	3.5	2.7	*1.9*	420	*0.42*	0.36	(248	4.78	*(.33*	*0.17*	5.4	128
0.61	*7.7ppb*	12.6	*6.8*	700	18.6	1.55	*(6*	31	*0.26*	*0.69*	9.06	*(8.7*
44	*(18ppb*	1.08	*(.7*	108	*(.6ppb*	*0.41*	*(7*	*(.89*	*(10ppb*	*0.27*	*(25ppb*	313
31	*(.2*	1.38		145	0.098	0.41	*(21*	*(.2*	*(26ppb*	*(.1*	*(.10*	148
13.2		7.7	*2.9*	75.1	*1.1*	*1.2*		10.5			48.8	160
0.3			8	715.3				34.9			8.5	1.1
5.9			3.6	109.9				17.5			5.6	11
12.8			3.8	566.4				3.4			0.9	78.9
18.8			3.7	726.6				8			2.9	127.8
27.9			5.6	550.3				3.9			1	206.1
22.2			6.6	994				7.6			1.6	261
8.1			5.8	244.1				99.1			2	47.1
			2.2	670.7				7.4			1.9	113.1

W ppm	Y ppm	Yb ppm	Zn ppm	Zr ppm	LOI WT%	Fe2O3 WT%	FeO WT%	H2O+ WT%	H2O- WT%	CO2 WT%
0.46	26	2.03	84	99		1.43	8.76	0.53	0.14	0.06
0.55	20	1.72	88	227	*(1.2*	4.46	2.06	0.78	1.00	*0.03*
0.021	*0.04*	*0.01*	*46*	*(4*		1.03	6.97	*0.44*	*0.06*	*0.08*
(.2	11	0.8	86	309		1.07	1.46	0.51	*0.11*	*0.08*
0.3	26	1.7	104	530		1.75	1.75	0.53	*0.08*	*0.11*
(.02	*(.1*	*0.024*	*42*	*10*	*(5.12*	*2.72*	5.06	4.71	*0.44*	*0.15*
0.27	27.6	2.02	105	179		2.82	8.58	*0.16*	*0.05*	*(.036*
1.5	*25*	2.6	*32*	219		0.5	1.27	*0.59*	*0.11*	*0.014*
1.4	26	2.27	103	*160*		4.19	*0.9*	*3.69*	*2.11*	*(2.97*
0.8	40	*4*	103	290		2.62	3.93	1.81	*0.1*	*0.1*
5.27	*13*	*0.94*	74	*53*		*(1.46*	*(1.41*		*(0.45*	11.58
3.6	46	4.4	235	1210		2.87	2.09	1.5	*0.19*	*0.026*
(.2	16	1.7	71	*22*		2.08	8.38	*0.1*	*0.07*	*(.02*
(.2	18	2.01	66	41	*(.6*	1.76	7.39	0.68	*0.33*	*(.040*
	40.6	3.4	64.1	165	21.7					1.01
	42		245.9	1292.3	1.5	0.19				
	21.7		36	239	0.59	0.11				
	15.1		57.8	156.7						
	18.3		77.7	168.8						
	24		95	170.3						
	26.1		111.2	276.7		0.02				
	21.8		111.8	530.7	0.53	0.08				
	16.9		97.3	246.8						