

Supplementary Material 3. $\text{Fe}^{2+}/\text{Fe}^{3+}$ analyses performed on the electron microprobe (standards and samples). All spectra were fitted using the bigaussian function.

	Mineral/zone	SiO ₂	TiO ₂	Al ₂ O ₃	Cr ₂ O ₃	Fe ₂ O ₃	FeO	MnO	MgO	NiO	CaO	Na ₂ O	K ₂ O	Total	Fe Wt %	Fe L α peak position
Fe²⁺ standards (pure Fe²⁺)																
	fayalite	28.95	0.02	0.05	0.13	0.00	70.33	0.26	0.12	0.00	0.03	0.01	0.00	99.90	54.67	68408(3)
	olivine1	37.15	0.01	0.05	0.00	0.00	28.71	0.46	33.84	0.03	0.19	0.00	0.00	100.44	22.32	68342(4)
	olivine2	39.28	0.00	0.02	0.00	0.00	17.84	0.19	42.19	0.15	0.23	0.00	0.00	99.90	13.86	68308(5)
	olivine3	41.09	0.01	0.02	0.00	0.00	9.53	0.15	48.90	0.28	0.09	0.01	0.00	100.08	7.41	68270(9)
Fe³⁺ standards (pure Fe³⁺)																
	hematite	0.03	0.00	-	-	97.51	0.00	0.00	0.00	-	0.03	0.02	0.01	97.60	69.94	68324(2)
	pyroxene1	53.91	0.34	2.96	0.04	30.01	0.00	0.01	0.25	-	0.38	13.03	0.03	100.97	21.1	68242(9)
	garnet1	34.19	5.30	2.76	0.04	22.89	0.00	0.26	0.40	-	33.13	0.00	0.00	98.97	16.0	68234(8)
	epidote3	38.60	0.00	25.66	0.02	10.76	0.00	0.05	0.05	0.01	23.63	0.01	0.00	98.79	7.53	68220(5)
	epidote4	37.50	0.04	21.30	0.00	15.61	0.00	0.10	0.00	0.00	22.89	0.00	0.00	97.44	10.92	68231(2)
Obsidian Cliffs																
	fayalite zone	31.1	-	0.00	-	0.00	57	5	7	-	-	-	-	99.9	44	68395(4)
	lahunitite zone	34.3	-	0.00	-	40.7*	19.7*	0.45	0.14	-	-	-	-	95.4	47.0	68324(6)
	"oxyfayalite" zone	35.8	-	0.11	-	47.1*	10.6*	0.27	0.06	-	-	-	-	94.0	44.9	68304(11)

Fe L α peak position is a mean value determined using 7 to 8 spectra. Number in parenthesis is 1 sigma standard deviation.

*calculated using the $\text{Fe}^{2+}/\text{Fe}^{3+}$ analyses performed on the microprobe using the standards listed in this Table.