

Table 12. Electron microprobe analyses and structural formulae of accessory minerals from plutonic and metamorphic rocks of the Peninsular Ranges batholith, San Diego County, California

Sample no.	Unit	Grain	Comment ¹	Mineral	SiO ₂	TiO ₂	Al ₂ O ₃	Cr ₂ O ₃	Fe ₂ O ₃	FeO	MnO	NiO	MgO	BaO	CaO	Na ₂ O	K ₂ O	F	Cl	Total
VM932	Chiquito Peak (Kcp)	gr1		titanite	29.46	37.28	0.92	0.00		1.17	0.16	0.00	0.00	0.00	27.88	0.03	0.00	0.24	0.00	97.13
VM932	Kcp	gr2		epidote	36.99	0.17	22.17	0.07		13.42	0.21	0.05	0.00	0.00	23.42	0.02	0.01	0.05	0.00	96.57
CP133	Kcp	gr1		epidote	37.41	0.04	22.84	0.03		12.54	0.36	0.05	0.00	0.00	23.67	0.00	0.00	0.00	0.00	96.94
CP170B	Amphibolite (Amphib.)	gr1	in JTrm	titanite	30.11	38.06	1.58	0.09		0.31	0.06	0.05	0.00	0.00	28.57	0.00	0.01	0.30	0.00	99.14
CP170B	Amphib.	gr2c	"	"	30.23	38.01	1.65	0.06		0.30	0.09	0.14	0.00	0.00	28.98	0.00	0.00	0.39	0.00	99.84
CP170B	Amphib.	gr3c	"	"	30.36	37.49	1.97	0.06		0.22	0.03	0.07	0.00	0.00	28.45	0.01	0.03	0.32	0.00	99.01
1079A1	Western metavolcanic	gr1	pelitic schist	aluminosil.	37.34		62.68			0.54										100.57
1079A1	rocks (Kmv)	gr2	"	"	36.83		60.77			0.66							0.06			98.33
1079A1	Kmv	fibrous mass	"	fibrolite	39.26		55.23						0.15			0.11	2.87			97.62
1079A1	Kmv	mixture	"	aluminosil.	36.18		55.80			1.07			0.16				0.18			93.39
1079C1	Kmv	gr1c	large aggregate	titanite	30.44	36.68	1.82			1.43					28.94					99.30
1079C1	Kmv	gr1r	"	"	31.66	34.92	3.69			1.07					27.97	0.16				99.47
1079C1	Kmv	gr2	"	"	30.46	36.55	1.49			1.34					29.15					98.99
1079C1	Kmv	gr3	"	"	29.88	37.10	1.19			1.46	0.06				28.92					98.62
1079C1	Kmv	gr4	small, mosaic	grossularite	38.01	0.22	11.78			14.68	1.38				34.16					100.24
1079C1	Kmv	gr5	"	"	38.26		12.18			14.50	1.77				33.80					100.52
1079K	Julian Schist (JTrm)	gr1		titanite	29.17	37.75	1.27			0.27					29.30					97.76
1079K	JTrm	gr2		"	29.38	34.62	3.14	0.09		0.34			0.06		29.27					96.91
J914	Harper Creek (Jhc)	gr1		tourmaline	36.30	1.72	32.08	0.00		7.45	0.10	0.00	6.51	0.00	1.50	1.57	0.08	0.18	0.00	87.48
Jhc15	Jhc	gr1c		cordierite	46.72	0.00	32.46	0.00		8.75	0.51	0.00	7.61		0.00	0.33	0.00	0.00	0.00	96.37
Jhc15	Jhc	gr1r-1		"	49.43	0.00	33.57	0.00		9.38	0.65	0.00	7.83		0.00	0.05	0.00	0.00	0.00	101.11
Jhc15	Jhc	gr1r-2		"	49.05	0.00	34.49	0.00		9.41	0.40	0.00	7.96		0.00	0.41	0.00	0.06	0.01	101.76
Jhc15	Jhc	gr2		"	49.37	0.00	34.92	0.00		9.62	0.42	0.00	8.24		0.00	0.41	0.00	0.00	0.00	102.98
Jhc15	Jhc	gr3c		"	48.34	0.00	34.40	0.00		9.04	0.63	0.00	8.06		0.00	0.31	0.00	0.00	0.00	100.77
Jhc15	Jhc	gr3r		"	47.05	0.00	34.07	0.00		8.73	0.60	0.00	7.69		0.00	0.26	0.00	0.00	0.00	98.42
CP106	Jhc	gr1		tourmaline	35.30	1.50	29.70			7.20			6.80		1.10	2.00				83.60
W2	La Posta (Klp)	gr1		titanite	28.96	37.22	1.57			0.51	0.10				27.69					96.08
W4	Klp	gr1		titanite	30.88	34.85	3.69			1.47			0.21		28.51					99.79
86CA036	Alpine (Ka)	gr1		epidote	35.97	0.62	24.77		11.74		0.26		0.07		23.73					97.16
86CA006	Granite Mountain (Kgm)	gr1 (avg. of 2)	in hbl	epidote	37.66	0.24	24.19		12.62		0.40		0.08		23.55					98.74
86CA043	Kgm	gr1-1	c/ilmenite ²	"	37.91	0.10	24.18		13.42		0.23		0.06		23.10					99.00
86CA043	Kgm	gr1-2	r/hbl	"	37.40		25.43		11.39		0.34		0.03		23.39					97.98
86CA043	Kgm	gr1-3	in hbl	"	37.10	0.04	24.01		13.41		0.26		0.04		24.47					99.33
86CA043	Kgm	gr1-4	"	"	37.64	0.21	24.95		11.91		0.31		0.08		24.54					99.64
86CA045	Kgm	gr1	r/hbl	"	37.65	0.18	23.01		14.32		0.20		0.01		23.35					98.72

1. Blank space indicates element/oxide not determined, not present, or below limit of detection
2. c/ilmenite= point in core, accessory against ilmenite; r/hbl= point in rim, accessory against hbl

Oxygens	Si	Ti	Al	Cr	Fe ³⁺	Fe ²⁺	Mn	Ni	Mg	Ca	Na	K	F	Cl	Total
23	4.62		9.14			0.06									13.81
23															
23	5.06		8.40						0.03		0.03	0.47			13.99
23	4.83		8.78			0.06			0.03			0.03			13.79
22	4.42	4.01	0.31			0.17				4.50					13.42
22	4.54	3.77	0.62			0.13				4.30	0.05				13.40
22	4.44	4.01	0.26			0.16				4.55					13.42
22	4.38	4.09	0.21			0.18	0.01			4.55					13.42
22	5.68	0.03	2.07			1.83	0.17			5.47					15.26
12	3.10		1.16			0.98	0.12			2.94					8.31
23	4.50	4.38	0.23			0.04				4.85					14.00
23	4.56	4.04	0.57	0.01		0.04			0.01	4.87					14.11
18	4.94	0.00	4.04	0.00		0.77	0.05	0.00	1.20	0.00	0.07	0.00	0.00	0.00	11.07
18	4.98	0.00	3.99	0.00		0.79	0.06	0.00	1.18	0.00	0.05	0.00	0.00	0.00	11.04
18	4.92	0.00	4.07	0.00		0.79	0.03	0.00	1.19	0.00	0.08	0.00	0.02	0.00	11.10
18	4.90	0.00	4.08	0.00		0.80	0.04	0.00	1.22	0.00	0.08	0.00	0.00	0.00	11.10
18	4.89	0.00	4.10	0.00		0.76	0.05	0.00	1.22	0.00	0.06	0.00	0.00	0.00	11.08
18	4.87	0.00	4.15	0.00		0.76	0.05	0.00	1.19	0.00	0.05	0.00	0.00	0.00	11.07
2	2.89	0.04	2.34		0.71		0.02		0.01	2.04					8.05
2	2.97	0.01	2.25		0.75		0.03		0.01	1.99					8.01
2	2.98	0.01	2.24		0.79		0.02		0.01	1.95					7.99
2	2.96		2.37		0.68		0.02		0.00	1.98					8.02
2	2.93	0.00	2.23		0.80		0.02		0.00	2.07					8.05
2	2.94	0.01	2.30		0.70		0.02		0.01	2.06					8.04
2	2.99	0.01	2.15		0.85		0.01		0.00	1.98					8.00