

Sphalerite-Pyrite-Pyrrhotite geobarometer

Hutchinson & Scott (1981) Econ. Geol.

005131

TABLE V-2

using analyses from Say-lee Kuo

Chemical Composition of Sphalerites from the Anvil Ore Deposits

Sample No.	Sulfide Assemblage*	(Weight Percent)**						(Mole Percent)				(Atomic Ratio)	
		Zn	Fe	Cd	Mn	S	Co	ZnS	FeS	CdS	MnS	CoS	Σ Cations: S
(Faro)													
66-2 283	(1)	52.80	10.49	0.15	2.49	34.08	-	77.49	18.04	0.13	4.35		0.98
342	(2)	52.29	11.08	X	2.17	34.46	-	77.05	19.13		3.82		0.97
400	(2)	55.34	8.10	0.21	1.56	34.20		81.97	15.10	0.18	2.75		0.97
474	(1)	60.02	5.86	X	0.09	34.03	-	89.59	10.25		0.16		0.97
486	(1)	54.98	10.59	0.13	0.12	34.19	-	81.33	18.35	0.11	0.22		0.97
66E9 299	(2)	53.08	11.30	0.18	1.09	34.35		78.39	19.55	0.15	1.91		0.97
337	(7)	59.54	6.43	X	0.07	34.34	-	88.65	11.23		0.12		0.96
376	(1)	57.87	8.08	X	0.10	33.94	-	85.79	14.03		0.18		0.98
401	(1)	56.08	9.94	0.05	0.09	33.85	-	82.65	17.16	0.04	0.16		0.98
436	(1)	55.72	10.16	X	0.05	34.08	-	82.32	17.59		0.09		0.97
66-10 634	(7)	56.98	8.82	0.11	0.20	33.90	-	84.28	15.28	0.09	0.35		0.98
67-4 460	(1)	53.19	11.20	0.11	1.42	34.08	-	78.14	19.27	0.10	2.49		0.98
593	⑤	55.61	10.11	X	0.16	34.16	-	82.21	17.52		0.27	2.4 kb	0.97
67-6 602	④	56.12	9.68	0.18	0.26	33.76	-	82.68	16.71	0.15	0.46	3.0 kb	0.99
710	(1)	57.02	8.73	X	0.14	34.11	0.04	84.52	15.16		0.25	0.07	0.97
754	⑥	54.92	10.67	0.10	0.10	34.21	-	81.24	18.49	0.09	0.18	1.6 kb	0.97
762	(1)	54.77	10.60	0.13	0.32	34.17	-	80.95	18.37	0.11	0.57		0.97
67-10 549	(8)	55.20	10.45	0.11	0.14	34.11	-	81.57	18.09	0.10	0.25		0.97
632	(7)	55.44	10.37	0.16	0.03	33.99	-	81.86	17.94	0.14	0.06		0.98

TABLE V-2 (cont'd)

Sample No.	Sulfide Assemblage*	Zn	(Weight Percent)**					Co	ZnS	(Mole Percent)			CoS	(Atomic Ratio) Σ Cations: S
			Fe	Cd	Mn	S	FeS			CdS	MnS			
(Faro)														
66-22 305	(1)	59.95	5.95	0.11	0.09	33.90	-	89.36	10.39	0.10	0.16			0.97
Anvil pit #1	(4)	56.08	9.76	X	0.21	33.91	0.05	82.69	16.86		0.37	0.08	2.9 kb	0.98
(Grum)														
A5-422	(1)	59.21	6.57	X	0.08	34.12	0.03	88.32	11.49		0.14	0.05		0.96
A10-507	(4)	56.67	9.56	X	0.05	34.16	-	83.43	16.48		0.09		3.2 kb	0.98
529	(5)	56.14	8.48	0.14	0.04	35.21	-	84.78	15.03	0.12	0.07		4.5 kb	0.92
575.5	(2)	60.21	5.64	X	0.05	34.08	0.06	89.94	9.87		0.09	0.10		0.96
616	(5)	56.49	9.42	0.14	0.17	33.78	-	83.31	16.27	0.12	0.30		3.4 kb	0.99
693	(1)	57.66	8.45	X	0.12	33.77	0.03	85.13	14.61		0.21	0.05		0.98
744	(6)	58.69	7.40	0.09	0.10	33.73	-	86.92	12.84	0.08	0.17		6.7 kb	0.98
774	(1)	61.28	4.99	0.16	0.04	33.54	-	91.11	8.68	0.13	0.08			0.98
802A	(1)	61.45	4.89	X	0.04	33.62	0.05	91.33	8.51		0.07	0.08		0.98
A11-594	(8) No	59.33	6.59	0.07	0.04	33.97	-	88.38	11.50	0.06	0.07			0.97
A12-538	(1)	61.22	4.98	X	0.04	33.69	0.05	91.16	8.69		0.07	0.08		0.98
819	(3)	56.51	9.46	X	0.16	33.78	-	83.37	16.34		0.29		3.4 kb	0.98
A13-150	(7)	62.03	4.48	0.14	0.02	33.34	-	92.06	7.79	0.12	0.03			0.99

TABLE V-2 (cont'd)

Sample No.	Sulfide Assemblage*	Zn	(Weight Percent)**					Co	ZnS	(Mole Percent)			CoS	(Atomic Ratio) Σ Cations: S
			Fe	Cd	Mn	S	FeS			CdS	MnS			
(Swim Lakes)														
Swim-X	③	55.11	10.47	0.10	0.27	34.05	-	81.34	18.10	0.09	0.48	1.9 kb	0.98	
(Vangorda)														
V18-120	⑨	55.99	9.90	0.17	0.19	33.74	-	82.44	17.07	0.15	0.34	2.7 kb	0.99	
V33-279	④	56.68	9.43	0.08	0.12	33.69	-	83.45	16.26	0.07	0.22	3.4 kb	0.99	
V35-153	⑩	56.16	10.02	0.03	0.06	33.73	-	82.61	17.26	0.03	0.11	2.6 kb	0.99	
V60-180(2)	④	57.33	9.11	0.11	0.10	33.35	-	84.09	15.64	0.09	0.18	4.0 kb	1.00	
V63-135	③	55.61	10.58	0.10	0.31	33.40	-	81.28	18.10	0.09	0.53	1.9 kb	1.00	
143	③	56.30	9.61	0.11	0.05	33.94	-	83.19	16.63	0.09	0.09	3.1 kb	0.98	

*Sulfide Assemblage: (1) Py + Gn, (2) Py + Gn + Mc, (3) Py + Po, (4) Py + Po + Gn, (5) Py + Po + Gn + Mc, (6) Py + Po + Gn + Cp, (7) Py + Gn + Cp, (8) Py + Gn + Cp + Mc, (9) Py + Po + Gn + Aspy, (10) Py + Po + Cp.

OK for 3-6, 9-10

**Electron microprobe analyses. Cd and Mn, where both are present, were analyzed by a wavelength dispersive detector, the rest by an energy dispersive detector.

X: not analyzed; -: not detected.

# Samples	Location	range	avg	
4	Faro	1.6 - 2.9	2.5 kb	8
4	Grum	3.2 - 4.5	3.6 kb	12
1	Swim	1.9	1.9 kb	
6	Vangorda	1.9 - 4.0	3.0 kb	10

15 km max on triple point

Gn - galena
Mc - marcasite
Cp - chalcopyrite

Assume that temp. of equilibration is below ~ 500°C
(1 bar, 2.5 kb)

~ 650°C
(5 kb)