Gems & Gemology **Data Depository:** Average LA-ICP-MS data (ppm by weight) of the tourmaline samples in this study.[a]
P. B. Merkel and C. M. Breeding, "Spectral differentiation between copper and iron colorants in gem tourmalines," Summer 2009 *G&G* , pp. 112**-119**.

Sample	Li	Be	B	Na	Mg	Al	Si	P	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Cu	Zn	Ga	Ge	As	Se	Sr	Y	Zr
B1	7879	20.7	32600	19555	283.5	255900	203600	292.3	168.9	2014	1.8	332.0	6.0	2.4	23450	216.5	14875	907.5	92.4	10.6	4.1	bdl	0.7	bdl	bdl
B2	8565	14.3	32600	19840	103.6	256450	195500	92.9	164.2	2921	2.5	22.4	bdl	1.3	11260	23105	0.4	1282	52.2	22.1	bdl	1.9	6.5	bdl	bdl
B3	10600	48.6	32600	13630	0.6	255400	190000	105.0	108.1	5546	2.6	5.6	bdl	1.3	1577	21.2	2321	0.3	297.3	9.7	5.1	bdl	bdl	bdl	bdl
B4	12045	12.1	32600	7776	14.5	250550	191950	78.1	64.8	20715	1.7	63.4	bdl	1.0	2562	978.1	1.4	77.2	137.7	16.3	1.9	39.8	8.7	0.2	bdl
B5	10695	5.3	32600	14850	2.6	271100	202250	73.1	88.3	1864	1.9	7.9	bdl	0.2	3933	2159	0.3	569.4	110.3	10.1	4.1	bdl	1.0	bdl	bdl
B6	10730	63.2	32600	15160	1.4	246600	202150	165.5	108.7	2644	2.0	6.5	0.3	1.2	138	6.5	607.2	0.3	343.5	12.4	bdl	5.1	bdl	bdl	bdl
B7	11100	17.0	32600	16095	22.8	239000	222550	262.4	161.9	6427	2.4	11.7	bdl	3.3	2042	4438.5	5.6	882.5	60.8	55.5	8.6	26.1	83.8	bdl	0.8
B8	10935	180.7	32600	14660	4.7	254850	196900	253.6	121.3	467	1.6	22.7	0.4	2.8	121	bdl	200.8	2.3	325.8	20.1	bdl	4.4	bdl	bdl	bdl
G1	7899	6.2	32600	18095	5.3	257000	191450	108.8	167.8	610	2.9	93.3	0.6	2.3	26060	139.5	1410	5.2	387.1	6.3	7.2	32.1	bdl	bdl	bdl
G2	9017	22.4	32600	19110	2.9	272450	193950	62.0	148.8	2868	2.4	40.2	bdl	1.3	7571	13265	4.4	1862	224.8	25.0	0.4	30.7	1.9	bdl	bdl
G3	7163	6.4	32600	20670	7.6	254100	206800	136.3	183.0	580	2.5	105.2	0.8	bdl	43155	865.4	1089	270.9	392.0	7.9	5.5	bdl	bdl	bdl	bdl
G4	9239	22.5	32600	18995	13.8	263200	208900	191.0	127.8	1823	1.7	42.1	bdl	2.5	9853	7866	0.2	1040	132.5	40.2	4.0	bdl	24.0	bdl	bdl
G5	9665	28.4	32600	15190	33.9	223550	190350	76.8	98.7	6608	6.3	90.9	bdl	0.5	3357	4332	0.5	56.9	280.3	8.8	6.8	32.8	41.7	1.0	bdl
G6	13270	16.0	32600	6438	22.0	257750	189650	15.5	61.0	28955	6.4	509.8	12.3	bdl	5529	8815	45.1	197.9	211.4	12.2	2.1	bdl	273.9	0.4	bdl
G7	10530	140.4	32600	12595	bdl	239950	171900	N/A	61.8	5077	N/A	22.1	bdl	0.6	1998	120.3	308.6	0.9	265.5	17.2	0.2	N/A	bdl	bdl	bdl
G8	40.9	bdl	32600	8002	77910	190400	202000	311.4	648.2	29515	1.9	2830	1171	47.4	85.5	33.6	1.0	15.8	34.5	0.7	bdl	20.2	731.4	bdl	0.4
P1	9678	2.2	32600	16720	0.5	251650	199900	55.1	138.2	513	2.6	4.9	bdl	2.7	9440	632.5	0.9	29.4	104.6	12.1	4.5	bdl	0.2	bdl	bdl
P2	8338	6.2	32600	16455	0.6	264550	202150	146.8	110.5	579	2.3	29.3	bdl	1.6	6783	bdl	14.8	0.5	444.2	5.8	2.7	18.8	bdl	bdl	bdl
P3	8456	7.1	32600	16455	bdl	251200	200350	217.5	131.4	659	1.9	16.0	bdl	2.2	9341	13.8	1386	0.7	383.3	3.7	2.5	17.0	bdl	bdl	bdl
P4	9079	10.1	32600	14760	1.5	243100	195250	135.8	159.8	1251	1.8	23.5	0.2	bdl	2238	7.7	336.0	2.0	501.0	5.0	5.3	14.3	bdl	bdl	bdl
P5	11180	129.6	32600	13385	2.3	254600	191600	124.9	103.7	6327	3.2	100.2	0.9	1.7	3156	292.8	225.1	9.1	289.3	18.5	bdl	2.4	0.4	bdl	bdl
P6	9236	7.1	32600	16145	0.3	263850	200800	102.4	134.0	1385	2.4	107.9	bdl	0.4	10960	7.9	556.3	bdl	524.8	4.7	bdl	bdl	bdl	bdl	bdl
P7	9479	3.9	32600	12365	bdl	160850	122450	N/A	201.9	953	N/A	124.0	0.6	2.0	17300	47.1	362.9	bdl	303.7	2.9	2.3	N/A	bdl	bdl	bdl
V1	9712	49.4	32600	17230	8.6	262900	210700	409.7	203.6	4378	1.5	44.1	0.3	2.4	18600	bdl	3818	1.5	316.0	9.3	1.0	8.9	0.3	bdl	0.3
V2	8374	7.8	32600	15995	6.4	255350	202650	194.7	153.0	760	1.9	16.6	bdl	0.6	8178	6.7	1667	2.7	386.4	6.7	2.0	bdl	bdl	bdl	0.3
Y1	13710	5.8	32600	3353	3.5	221200	194150	83.4	28.9	29915	25.4	157.0	bdl	1.3	3052	840.5	0.3	12.2	90.7	11.4	4.2	bdl	39.9	bdl	bdl

[a] The following elements were below detection limits (bdl) for all samples: Ag, Au, Co, Cs, Er, Hf, Ho, Ir, Lu, Os, Pd, Pt, Rb, Re, Rh, Ru, Tb, Tc, Tl, Tm, U, W, and Yb.
Data were collected using Thermo X-Series II ICP-MS and New Wave UP-213 laser ablation system (40 micrometer spot, 7 Hz rep rate, ~10 J/cm^2 laser energy, He carrier gas).
[b] For use as an internal standard, the boron concentration was fixed at 32600 ppm (average value from W.A. Deer, R.A. Howie, and J. Zussman, *An Introduction to the Rock-Forming Minerals* , Longman, London, 1974, pp. 90-96).

Nb	Mo	Cd	Sn	Sb	Te	Ba	La	Ce	Pr	Nd	Sm	Eu	Gd	Dy	Ta	Pb	Bi	Th
1.1	bdl	0.6	2.3	0.8	0.2	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	2.3	24.1	241.8	bdl
0.8	bdl	0.3	56.4	4.1	bdl	bdl	bdl	0.2	bdl	bdl	bdl	bdl	bdl	bdl	2.2	329.8	1.0	bdl
2.5	bdl	2.5	4.7	14.0	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	2.8	89.1	1907	0.6
2.3	bdl	bdl	7.1	41.7	bdl	0.5	7.6	29.0	3.6	12.6	6.7	bdl	2.4	bdl	1.1	413.4	1.3	bdl
3.9	bdl	bdl	23.4	6.7	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	5.1	290.1	0.2	bdl
2.0	bdl	4.8	3.9	15.3	0.3	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	3.0	56.9	2297	1.8
1.0	bdl	0.4	144.4	183.7	bdl	0.3	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	2.8	754.3	bdl	0.7
0.2	bdl	27.7	3.7	19.1	bdl	0.2	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	1.0	10.3	7572	3.8
0.7	0.3	0.3	5.2	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	0.5	7.0	26.8	bdl
3.3	bdl	2.8	109.9	0.6	bdl	0.3	bdl	0.7	bdl	bdl	bdl	bdl	bdl	bdl	1.5	144.8	1.3	0.6
0.4	0.3	0.5	2.1	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	0.7	22.1	23.6	bdl
1.9	bdl	bdl	212.0	14.4	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	6.0	628.9	0.4	0.4
3.8	bdl	0.8	113.7	2.0	bdl	bdl	9.9	36.7	4.2	16.8	8.2	bdl	1.7	0.5	1.2	2421	1.7	20.5
2.3	bdl	2.6	32.9	72.0	bdl	bdl	82.2	165.2	13.0	33.8	3.1	0.5	0.9	bdl	0.5	183.7	700	bdl
bdl	bdl	22.8	5.8	30.3	N/A	bdl	0.6	1.7	bdl	0.4	0.2	bdl	0.3	bdl	1.0	20.6	8001	0.7
bdl	bdl	0.2	2.6	bdl	bdl	3.6	0.8	1.1	bdl	0.2	bdl	bdl	bdl	bdl	1.0	2.0	bdl	bdl
0.6	bdl	0.6	18.7	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	0.2	83.8	bdl	bdl
0.8	bdl	0.7	12.1	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	0.8	9.6	18.3	bdl
1.4	bdl	0.6	3.0	0.5	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	0.6	7.1	46.5	bdl
1.5	bdl	0.3	6.7	1.0	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	0.7	8.1	101.2	bdl
0.2	bdl	17.1	16.4	41.2	0.3	bdl	0.6	1.6	bdl	bdl	bdl	bdl	bdl	bdl	0.8	25.0	7207	0.2
1.1	bdl	0.6	13.5	0.2	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	0.5	8.5	37.0	bdl
0.7	0.6	0.5	12.3	bdl	N/A	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	5.2	17.1	bdl
2.7	bdl	1.2	7.2	6.5	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	3.8	92.3	870.3	0.2
1.1	bdl	0.3	9.3	0.7	bdl	12.4	bdl	bdl	bdl	bdl	bdl	bdl	bdl	bdl	0.7	8.9	57.2	bdl
3.2	bdl	bdl	57.8	49.4	bdl	bdl	8.3	22.5	1.9	4.2	0.6	bdl	bdl	bdl	bdl	222.3	1.7	bdl

Molecular formula (no. of atoms in empirical formula; fixed values are shaded and constant as follows: B = 3, O = 18, (O,OH,F) = 4)

Na	Ca	K	Pb	Bi	Li	Mg	Al	Ti	V	Cr	Mn	Fe	Cu	Zn	Ga	B	Si	O	O, OH, F	**Tourmaline variety**
0.85	0.05	0.00	0.00	0.00	1.13	0.01	9.44	0.01	0.00	0.00	0.42	0.00	0.23	0.01	0.00	3.00	7.21	18.00	4.00	Elbaite
0.86	0.07	0.00	0.00	0.00	1.23	0.00	9.46	0.00	0.00	0.00	0.20	0.41	0.00	0.02	0.00	3.00	6.93	18.00	4.00	Elbaite
0.59	0.14	0.00	0.00	0.01	1.52	0.00	9.42	0.00	0.00	0.00	0.03	0.00	0.04	0.00	0.00	3.00	6.73	18.00	4.00	Elbaite
0.34	0.51	0.00	0.00	0.00	1.73	0.00	9.24	0.00	0.00	0.00	0.05	0.02	0.00	0.00	0.00	3.00	6.80	18.00	4.00	Liddicoatite
0.64	0.05	0.00	0.00	0.00	1.53	0.00	10.00	0.00	0.00	0.00	0.07	0.04	0.00	0.01	0.00	3.00	7.16	18.00	4.00	Elbaite
0.66	0.07	0.00	0.00	0.01	1.54	0.00	9.09	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	3.00	7.16	18.00	4.00	Elbaite
0.70	0.16	0.00	0.00	0.00	1.59	0.00	8.81	0.00	0.00	0.00	0.04	0.08	0.00	0.01	0.00	3.00	7.88	18.00	4.00	Elbaite
0.63	0.01	0.00	0.00	0.04	1.57	0.00	9.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00	6.97	18.00	4.00	Elbaite
0.78	0.02	0.00	0.00	0.00	1.13	0.00	9.48	0.00	0.00	0.00	0.47	0.00	0.02	0.00	0.01	3.00	6.78	18.00	4.00	Elbaite
0.83	0.07	0.00	0.00	0.00	1.29	0.00	10.05	0.00	0.00	0.00	0.14	0.24	0.00	0.03	0.00	3.00	6.87	18.00	4.00	Elbaite
0.89	0.01	0.00	0.00	0.00	1.03	0.00	9.37	0.00	0.00	0.00	0.78	0.02	0.02	0.00	0.01	3.00	7.33	18.00	4.00	Elbaite
0.82	0.05	0.00	0.00	0.00	1.32	0.00	9.70	0.00	0.00	0.00	0.18	0.14	0.00	0.02	0.00	3.00	7.40	18.00	4.00	Elbaite
0.66	0.16	0.00	0.01	0.00	1.39	0.00	8.24	0.00	0.00	0.00	0.06	0.08	0.00	0.00	0.00	3.00	6.74	18.00	4.00	Elbaite
0.28	0.72	0.00	0.00	0.00	1.90	0.00	9.50	0.01	0.00	0.00	0.10	0.16	0.00	0.00	0.00	3.00	6.72	18.00	4.00	Liddicoatite
0.55	0.13	0.00	0.00	0.04	1.51	0.00	8.85	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	3.00	6.09	18.00	4.00	Elbaite
0.35	0.73	0.02	0.00	0.00	0.01	3.19	7.02	0.06	0.02	0.00	0.00	0.00	0.00	0.00	0.00	3.00	7.16	18.00	4.00	Uvite
0.72	0.01	0.00	0.00	0.00	1.39	0.00	9.28	0.00	0.00	0.00	0.17	0.01	0.00	0.00	0.00	3.00	7.08	18.00	4.00	Elbaite
0.71	0.01	0.00	0.00	0.00	1.20	0.00	9.75	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.01	3.00	7.16	18.00	4.00	Elbaite
0.71	0.02	0.00	0.00	0.00	1.21	0.00	9.26	0.00	0.00	0.00	0.17	0.00	0.02	0.00	0.01	3.00	7.10	18.00	4.00	Elbaite
0.64	0.03	0.00	0.00	0.00	1.30	0.00	8.96	0.00	0.00	0.00	0.04	0.00	0.01	0.00	0.01	3.00	6.92	18.00	4.00	Elbaite
0.58	0.16	0.00	0.00	0.03	1.60	0.00	9.39	0.00	0.00	0.00	0.06	0.01	0.00	0.00	0.00	3.00	6.79	18.00	4.00	Elbaite
0.70	0.03	0.00	0.00	0.00	1.32	0.00	9.73	0.00	0.00	0.00	0.20	0.00	0.01	0.00	0.01	3.00	7.11	18.00	4.00	Elbaite
0.54	0.02	0.01	0.00	0.00	1.36	0.00	5.93	0.00	0.00	0.00	0.31	0.00	0.01	0.00	0.00	3.00	4.34	18.00	4.00	Elbaite
0.75	0.11	0.01	0.00	0.00	1.39	0.00	9.69	0.00	0.00	0.00	0.34	0.00	0.06	0.00	0.00	3.00	7.46	18.00	4.00	Elbaite
0.69	0.02	0.00	0.00	0.00	1.20	0.00	9.42	0.00	0.00	0.00	0.15	0.00	0.03	0.00	0.01	3.00	7.18	18.00	4.00	Elbaite
0.15	0.74	0.00	0.00	0.00	1.97	0.00	8.16	0.00	0.00	0.00	0.06	0.01	0.00	0.00	0.00	3.00	6.88	18.00	4.00	Liddicoatite