Supplementary Material A. EPMA and LA-ICP-MS methodology

Electron probe microanalysis (EPMA)

A Cameca SX-Five Electron Probe Microanalyser (EPMA) was operated at an accelerating voltage of 20 kV, a beam current of 20 nA and an estimated beam diameter of ~1 μm.

X-ray lines and standards used were as follows: S Kα (greenockite), Pb Mα (galena), Cd Lα (greenockite), As Lα (gallium arsenide), Se Lα (bismuth selenide), Fe Kα, Cu Kα (chalcopyrite), Mn Kα (rhodonite), Ag Lα (silver telluride), Sn Lα (cassiterite), In Lα (indium), Hg Lα (cinnabar), Zn Kα (sphalerite), Ni Kα (pentlandite), Co Kα (cobalt), Sb Lα (stibnite), Te Lα (silver telluride), Bi Mα (bismuth selenide), Tl Mα (thallium), and Au Lα (gold). Count times were 10 seconds (s) for unknown and 10 s background for all elements. The average minimum detection limits, in wt.%, were: S (0.014), Pb (0.035), Cd (0.032), As (0.05), Se (0.034), Fe (0.02), Cu (0.038), Mn (0.019), Ag (0.06), Sn (0.029), In (0.018), Hg (0.079), Zn (0.029), Ni (0.024), Co (0.17), Sb (0.029), Te (0.015), Bi (0.029), Tl (0.048), and Au (0.14).

Laser-ablation inductively coupled – plasma mass spectrometry (LA-ICP-MS)

LA-ICP-MS analysis was performed on a Resonetics M-50-LR 193 nm Excimer laser attached to an Agilent 7700cx Quadrupole ICP mass spectrometer. This new-generation laser system offers excellent spatial resolution coupled with sub-ppm level sensitivity. The M-50 utilizes a two-volume ablation cell designed by Laurin Technic Pty. Ablation was performed in an atmosphere of UHP He (0.71/min), and upon exiting the cell the aerosol sell is mixed with Ar (0.93 l/min) immediately after the ablation cell, after which the mix is passed through a pulse-homogenizing device prior to direction into the torch. The ICP-MS system was optimized daily to maximize sensitivity on isotopes of the mass range of interest, while keeping production of molecular oxide species and doubly-charged ion species as low as possible (usually <0.2%).

LA-ICP-MS spot analysis was carried out with the laser beam energy output set at 80 mJ at a 30 μm spot size. A laser repetition rate of 10 Hz was used in the polished blocks and of 5 Hz in thin section. The following basic set of isotopes were monitored: ^{34}S, ^{51}V, ^{52}Cr, ^{55}Mn, ^{57}Fe, ^{59}Co, ^{60}Ni, ^{65}Cu, ^{66}Zn, ^{69}Ga, ^{75}As, ^{77}Se, ^{95}Mo, ^{107}Ag, ^{111}Cd, ^{115}In, ^{118}Sn, ^{121}Sb, ^{125}Te, ^{137}Ba, ^{182}W, ^{193}Ir, ^{197}Au, ^{202}Hg, ^{204}Pb, ^{205}Tl, ^{208}Pb, and ^{209}Bi. Analysis time for each spot analysis was a uniform 80 s, comprising a 30-s measurement of background (laser-off), and 50-s analysis of the unknown (laser-on). Standard reference material was Mass-1 using coefficients given by Wilson et al. (2002). Standards were run after each batch of 22-26 unknowns; detection limits were calculated for each element in each spot analysis. Internal calibration was achieved using concentration values of Cu, obtained from electron probe microanalysis.

Data reduction was performed using GLITTER software (Van Achterbergh et al., 2001). The analytical uncertainty output in GLITTER is a combination of internal (counting statistics, noise of the measurements over the length of analysis) and external signal uncertainties (mass bias, correction of unknowns to standards, laser-induced elemental fractionation (LIEF), instrument drift). Assuming a stabilized cell, the largest contribution to analytical uncertainty will be LIEF, followed by counting statistics, followed by instrument drift. To minimize LIEF, the spot size, frequency, and fluence are identical from standards to unknowns. Additionally, dwell times are kept as long as reasonably possible and the method is run for as long as reasonably possible, to get better count statistics.

References

Wilson, S., Ridley, W., Koenig, A., 2002. Development of sulphide calibration standards for the laser ablation inductively-coupled plasma mass spectrometry technique. J. Anal. At. Spectrom. 17, 406–409.

Van Achterbergh, E., Ryan, C.G., Jackson, S.E., Griffin, W.L., 2001. Data reduction software for LAICP-MS. In: Sylvester, J.P. (Ed.), Laser-ablation-ICPMS in the Earth Sciences; Principles and Applications. Mineralogical Association of Canada, Short Course Series 29, 239-243.

Table S1. EPMA data for bornite, chalcopyrite and chalcocite of the Zhibula Cu skarn.

	Cu	Ag	Fe	Pb	Bi	S	Se	Co	Total	Cu	Ag	Pb	Fe	Bi	Total M	S	Se	S(+Se)	M/S
	Normal bornite (Cu_5FeS_4) (wt.%)									Formula (to 10 atoms)									
8Bn-1	63.36	0.13	11.29	0.10	0.24	26.24	<dl	<dl	101.37	4.934	0.006	0.002	1.000	0.006	5.949	4.051	-	4.051	1.468
8Bn-2	63.68	0.20	11.22	0.05	0.14	26.11	0.04	0.02	101.45	4.959	0.009	0.001	0.995	0.003	5.968	4.030	0.002	4.032	1.480
8Bn-3	63.55	0.12	11.24	<dl	0.19	26.12	<dl	<dl	101.22	4.955	0.005	-	0.998	0.004	5.963	4.037	-	4.037	1.477
8Bn-4	63.40	0.15	11.22	0.05	0.20	26.30	0.05	0.02	101.37	4.934	0.007	0.001	0.994	0.005	5.940	4.057	0.003	4.060	1.463
8Bn-5	63.19	0.10	11.23	0.05	0.22	26.16	0.09	<dl	101.03	4.935	0.005	0.001	0.998	0.005	5.945	4.050	0.006	4.055	1.466
8Bn-6	63.22	0.11	11.32	<dl	0.25	26.27	<dl	<dl	101.17	4.927	0.005	-	1.004	0.006	5.942	4.058	-	4.058	1.464
8Bn-7	63.69	0.14	11.21	0.06	0.20	26.23	0.08	0.03	101.59	4.950	0.006	0.001	0.991	0.005	5.954	4.041	0.005	4.046	1.471
8Bn-8	63.47	0.10	11.26	<dl	0.15	25.77	0.04	<dl	100.79	4.978	0.005	-	1.005	0.004	5.991	4.006	0.003	4.009	1.495
8Bn-9	63.76	0.15	11.32	<dl	0.14	25.99	<dl	<dl	101.35	4.970	0.007	-	1.004	0.003	5.984	4.016	-	4.016	1.490
8Bn-10	63.76	<dl	11.21	<dl	0.18	26.35	0.09	0.02	101.59	4.948	-	-	0.990	0.004	5.942	4.053	0.005	4.058	1.464
8Bn-11	63.06	0.08	11.16	0.07	0.19	26.18	<dl	<dl	100.75	4.935	0.004	0.002	0.994	0.005	5.939	4.061	-	4.061	1.463
8Bn-12	63.57	<dl	11.15	<dl	0.14	26.05	0.05	<dl	100.96	4.967	-	-	0.991	0.003	5.962	4.035	0.003	4.038	1.476
8Bn-13	62.57	0.10	10.87	<dl	0.20	26.13	0.05	<dl	99.91	4.931	0.005	-	0.975	0.005	5.915	4.082	0.003	4.085	1.448
8Bn-14	63.26	0.06	11.26	0.04	0.19	26.17	0.07	0.02	101.06	4.938	0.003	0.001	1.000	0.005	5.946	4.049	0.004	4.054	1.467
8Bn-15	62.80	0.10	10.88	0.05	0.13	27.74	<dl	0.03	101.71	4.820	0.005	0.001	0.950	0.003	5.779	4.221	-	4.221	1.369
8Bn-16	62.96	0.14	11.07	<dl	0.11	26.09	<dl	<dl	100.37	4.942	0.006	-	0.989	0.003	5.940	4.060	-	4.060	1.463
8Bn-17	62.50	0.10	10.87	<dl	0.19	26.25	0.04	<dl	99.95	4.920	0.005	-	0.973	0.005	5.902	4.095	0.003	4.098	1.440
8Bn-18	62.52	0.23	10.78	<dl	0.15	26.33	0.04	0.02	100.05	4.916	0.011	-	0.965	0.003	5.894	4.103	0.002	4.106	1.436
8Bn-19	63.47	0.11	10.91	<dl	0.12	26.01	<dl	0.02	100.61	4.977	0.005	-	0.973	0.003	5.958	4.042	-	4.042	1.474
8Bn-20	63.41	0.14	11.48	0.08	0.21	26.64	0.07	<dl	102.04	4.896	0.006	0.002	1.009	0.005	5.918	4.078	0.005	4.082	1.450
8Bn-21	63.47	0.13	11.29	0.07	0.31	26.66	0.04	<dl	101.98	4.905	0.006	0.002	0.993	0.007	5.914	4.084	0.003	4.086	1.447
8Bn-22	63.52	0.13	11.31	0.10	0.14	26.69	<dl	<dl	101.89	4.907	0.006	0.002	0.994	0.003	5.913	4.087	-	4.087	1.447
8Bn-23	63.31	0.22	11.32	0.06	0.21	26.56	<dl	0.02	101.69	4.906	0.010	0.001	0.998	0.005	5.920	4.080	-	4.080	1.451
8Bn-24	63.53	0.14	11.33	0.11	0.20	26.71	<dl	<dl	102.03	4.904	0.006	0.003	0.995	0.005	5.913	4.087	-	4.087	1.447
8Bn-25	63.42	0.11	11.21	0.07	0.22	26.41	<dl	0.02	101.44	4.929	0.005	0.002	0.991	0.005	5.932	4.068	-	4.068	1.458
8Bn-26	63.49	0.09	11.25	0.25	0.18	26.51	0.09	0.02	101.88	4.917	0.004	0.006	0.992	0.004	5.924	4.071	0.006	4.076	1.453
8Bn-27	63.45	0.14	11.27	<dl	0.16	26.70	0.04	0.04	101.75	4.905	0.007	-	0.991	0.004	5.907	4.091	0.002	4.093	1.443
8Bn-28	63.85	0.09	11.31	0.06	0.18	26.48	0.06	0.02	102.08	4.935	0.004	0.001	0.995	0.004	5.940	4.057	0.004	4.060	1.463
8Bn-29	63.90	0.13	11.26	0.07	0.15	26.23	<dl	0.03	101.76	4.959	0.006	0.002	0.994	0.004	5.965	4.035	-	4.035	1.478
Mean (29)	**63.35**	**0.13**	**11.19**	**0.08**	**0.18**	**26.35**	**0.06**	**0.02**	**101.27**	**4.931**	**0.005**	**0.001**	**0.991**	**0.004**	**5.933**	**4.065**	**0.002**	**4.067**	**1.459**
180Bn-1	60.69	<dl	14.76	<dl	0.25	26.76	0.05	0.16	102.52	4.645	-	-	1.286	0.006	5.937	4.060	0.003	4.063	1.461
180Bn-2	60.59	0.06	14.87	<dl	0.26	26.83	<dl	0.17	102.61	4.632	0.003	-	1.294	0.006	5.934	4.066	-	4.066	1.460
180Bn-3	60.86	<dl	15.23	<dl	0.30	26.22	<dl	0.08	102.61	4.672	-	-	1.331	0.007	6.010	3.990	-	3.990	1.506

Mean (3)	**60.71**	**0.06**	**14.96**	<dl	**0.27**	**26.60**	**0.05**	**0.14**	**102.58**	**4.650**	**0.001**	-	**1.303**	**0.006**	**5.960**	**4.039**	**0.001**	**4.040**	**1.476**
372Bn-1	62.93	0.10	11.65	0.09	0.25	26.23	0.06	0.02	101.34	4.901	0.005	0.002	1.032	0.006	5.946	4.050	0.004	4.054	1.467
372Bn-2	62.52	0.09	11.64	<dl	0.39	26.13	<dl	<dl	100.77	4.894	0.004	-	1.037	0.009	5.945	4.055	-	4.055	1.466
Mean (2)	**62.72**	**0.10**	**11.64**	**0.09**	**0.32**	**26.18**	**0.06**	**0.02**	**101.06**	**4.898**	**0.004**	**0.001**	**1.035**	**0.008**	**5.945**	**4.053**	**0.002**	**4.055**	**1.466**
374Bn-1	63.57	<dl	11.44	0.06	0.22	23.38	<dl	0.02	98.67	5.167	-	0.001	1.058	0.005	6.232	3.768	-	3.768	1.654
374Bn-2	63.79	<dl	11.30	0.05	0.17	24.90	<dl	0.02	100.26	5.060	-	0.001	1.020	0.004	6.085	3.915	-	3.915	1.554
374Bn-3	63.71	<dl	11.41	<dl	0.14	24.98	<dl	0.03	100.24	5.046	-	-	1.028	0.003	6.078	3.922	-	3.922	1.549
374Bn-4	63.66	<dl	11.41	<dl	0.20	24.90	0.05	<dl	100.21	5.049	-	-	1.029	0.005	6.083	3.914	0.003	3.917	1.553
374Bn-5	63.47	0.06	11.31	<dl	0.20	25.20	0.07	0.02	100.37	5.020	0.003	-	1.018	0.005	6.046	3.950	0.004	3.954	1.529
374Bn-6	63.53	<dl	11.33	<dl	0.12	25.23	0.06	<dl	100.27	5.022	-	-	1.019	0.003	6.044	3.952	0.004	3.956	1.528
374Bn-7	63.87	<dl	11.37	0.07	0.14	25.21	0.08	<dl	100.75	5.032	-	0.002	1.020	0.003	6.057	3.938	0.005	3.943	1.536
374Bn-8	64.50	<dl	10.27	0.03	0.19	25.18	0.07	<dl	100.23	5.110	-	0.001	0.926	0.004	6.041	3.955	0.004	3.959	1.526
374Bn-9	64.01	<dl	11.49	<dl	0.14	25.39	0.07	0.02	101.14	5.020	-	-	1.026	0.003	6.049	3.947	0.004	3.951	1.531
374Bn-10	64.13	<dl	11.40	<dl	0.15	25.16	<dl	0.02	100.90	5.048	-	-	1.022	0.004	6.074	3.926	-	3.926	1.547
374Bn-11	62.79	0.19	11.59	0.08	0.51	25.64	0.07	<dl	100.90	4.938	0.009	0.002	1.037	0.012	5.998	3.997	0.005	4.002	1.499
374Bn-12	63.76	<dl	11.28	0.10	0.16	25.05	<dl	0.02	100.34	5.047	-	0.002	1.016	0.004	6.070	3.930	-	3.930	1.544
374Bn-13	61.39	0.20	11.37	0.10	0.29	25.06	0.09	<dl	98.59	4.938	0.009	0.002	1.041	0.007	5.998	3.996	0.006	4.002	1.499
Mean (13)	**63.55**	**0.11**	**11.31**	**0.07**	**0.20**	**25.02**	**0.06**	**0.02**	**100.22**	**5.038**	**0.002**	**0.001**	**1.020**	**0.005**	**6.065**	**3.932**	**0.003**	**3.935**	**1.542**
	Chalcopyrite ($CuFeS_2$) (wt.%)									Formula (to 4 atoms)									
180Cp-1	34.91	<dl	30.52	0.07	0.14	35.54	0.06	0.04	101.28	0.996	-	0.000	0.991	0.001	1.988	2.010	0.001	2.011	0.989
180Cp-2	34.24	<dl	31.98	<dl	0.14	35.24	0.03	0.06	101.62	0.975	-	-	1.036	0.001	2.011	1.988	0.001	1.989	1.011
180Cp-3	34.67	<dl	30.56	<dl	0.11	35.79	0.06	0.05	101.19	0.987	-	-	0.990	0.001	1.979	2.020	0.001	2.021	0.979
180Cp-4	34.29	<dl	30.08	<dl	0.06	35.62	0.04	0.05	100.14	0.985	-	-	0.984	0.001	1.970	2.029	0.001	2.030	0.970
180Cp-5	34.57	0.06	29.89	0.08	0.16	35.57	0.04	0.05	100.37	0.993	0.001	0.000	0.977	0.001	1.973	2.026	0.001	2.027	0.973
180Cp-6	35.33	<dl	30.92	0.06	0.30	32.71	0.06	0.10	99.37	1.043	-	0.000	1.039	0.003	2.084	1.914	0.001	1.915	1.088
Mean (6)	**34.67**	**0.01**	**30.66**	**0.03**	**0.15**	**35.08**	**0.05**	**0.06**	**100.66**	**0.997**	**0.000**	**0.000**	**1.003**	**0.001**	**2.001**	**1.998**	**0.001**	**1.999**	**1.001**
372Cp-1	35.22	0.07	30.40	<dl	0.13	35.36	<dl	0.05	101.21	1.006	0.001	-	0.989	0.001	1.997	2.003	-	2.003	0.997
372Cp-2	34.34	<dl	29.98	0.10	0.13	35.40	0.07	0.13	100.04	0.990	-	0.000	0.983	0.001	1.975	2.023	0.002	2.025	0.975
Mean (2)	**34.78**	**0.04**	**30.19**	**0.05**	**0.13**	**35.38**	**0.04**	**0.09**	**100.63**	**0.998**	**0.001**	**0.000**	**0.986**	**0.001**	**1.986**	**2.013**	**0.001**	**2.014**	**0.986**
374Cp	35.10	<dl	30.35	<dl	0.07	33.99	<dl	0.03	99.51	1.025	-	-	1.008	0.001	2.033	1.967	-	1.967	1.034
Mean (1)	**35.10**	<dl	**30.35**	<dl	**0.07**	**33.99**	<dl	**0.03**	**99.51**	**1.025**	-	-	**1.008**	**0.001**	**2.033**	**1.967**	-	**1.967**	**1.034**
321Cp-1	33.67	<dl	29.82	<dl	0.12	35.14	<dl	0.03	98.81	0.981	-	-	0.989	0.001	1.971	2.029	-	2.029	0.971
321Cp-2	33.42	<dl	29.98	<dl	0.09	35.18	0.04	0.04	98.71	0.973	-	-	0.993	0.001	1.968	2.031	0.001	2.032	0.968
321Cp-3	33.65	<dl	30.04	<dl	0.15	35.29	0.08	0.03	99.20	0.976	-	-	0.992	0.001	1.969	2.029	0.002	2.031	0.969
321Cp-4	33.47	<dl	30.16	0.04	0.09	35.25	0.06	0.04	99.07	0.972	-	0.000	0.996	0.001	1.969	2.029	0.001	2.031	0.970
Mean (4)	**33.55**	<dl	**30.00**	**0.01**	**0.11**	**35.22**	**0.04**	**0.04**	**98.95**	**0.976**	-	**0.000**	**0.993**	**0.001**	**1.969**	**2.030**	**0.001**	**2.031**	**0.970**
355Cp-1	34.19	<dl	29.46	<dl	0.10	35.63	0.04	0.08	99.41	0.988	-	-	0.969	0.001	1.958	2.041	0.001	2.042	0.959

355Cp-2	34.47	<dl	29.85	<dl	0.13	35.05	<dl	0.06	99.51	1.000	-	-	0.985	0.001	1.986	2.014	-	2.014	0.986
355Cp-3	34.18	<dl	29.62	<dl	0.14	35.81	<dl	0.04	99.74	0.984	-	-	0.970	0.001	1.956	2.044	-	2.044	0.957
355Cp-4	34.68	<dl	30.51	<dl	0.15	34.95	<dl	0.03	100.29	1.000	-	-	1.001	0.001	2.002	1.998	-	1.998	1.002
355Cp-5	34.67	<dl	30.27	<dl	0.13	34.92	0.06	0.05	100.06	1.002	-	-	0.995	0.001	1.998	2.000	0.001	2.002	0.998
Mean (5)	**34.44**	<dl	**29.94**	<dl	**0.13**	**35.27**	**0.02**	**0.05**	**99.80**	**0.995**	-	-	**0.984**	**0.001**	**1.980**	**2.020**	**0.000**	**2.020**	**0.980**
	Chalcocite (Cu_2S) (wt.%)									Formula (to 3 atoms)									
374Cc-1	77.20	0.06	1.93	0.03	0.14	22.55	0.08	<dl	102.09	1.864	0.001	0.000	0.053	0.001	1.919	1.079	0.002	1.081	1.775
374Cc-2	76.42	0.16	1.76	0.09	0.11	23.14	0.07	<dl	101.75	1.841	0.002	0.001	0.048	0.001	1.894	1.105	0.001	1.106	1.711
374Cc-3	75.61	<dl	2.38	<dl	0.15	22.61	<dl	0.02	100.79	1.841	-	-	0.066	0.001	1.908	1.092	-	1.092	1.748
Mean (3)	**76.41**	**0.07**	**2.02**	**0.04**	**0.13**	**22.77**	**0.05**	**0.01**	**101.55**	**1.849**	**0.001**	**0.000**	**0.056**	**0.001**	**1.907**	**1.092**	**0.001**	**1.093**	**1.745**

Note: <dl, below minimum limit of detection.

Table S2. EPMA data for common Cu-Bi-sulphosalts (wittichenite and aikinite) of the Zhibula Cu skarn.

	Cu	Ag	Fe	Cd	Pb	Mn	Bi	S	Te	Se	Total	Cu	Ag	Pb	Fe	Cd	Cu+Ag+Fe	Pb+Cd	Bi	Bi+Sb+As	Total M	S	Te	Se	S(+Te+Se)	Charge M	Charge S	mean	diff.	diff (%)
	Wittichenite (Cu_3BiS_3) (wt.%)											Formula (to 7 atoms)																		
374Witt-1	38.79	0.30	0.60	0.09	<dl	<dl	39.25	19.87	<dl	0.07	98.97	2.981	0.013	-	0.053	0.004	3.047	0.004	0.917	0.917	3.968	3.028	-	0.004	3.032	5.859	6.063	5.961	-0.204	-3.421
374Witt-2	39.23	0.39	0.67	<dl	<dl	<dl	39.15	19.96	<dl	0.11	99.51	2.992	0.017	-	0.058	-	3.068	-	0.908	0.908	3.976	3.017	-	0.007	3.024	5.850	6.048	5.949	-0.198	-3.328
374Witt-3	39.56	0.38	0.90	0.06	<dl	<dl	40.42	20.12	<dl	<dl	101.44	2.977	0.017	-	0.077	0.003	3.071	0.003	0.925	0.925	3.999	3.001	-	-	3.001	5.928	6.003	5.965	-0.075	-1.251
374Witt-4	39.80	0.50	1.16	0.08	<dl	<dl	39.39	19.80	<dl	0.05	100.79	3.004	0.022	-	0.100	0.003	3.126	0.003	0.904	0.904	4.034	2.963	-	0.003	2.966	5.946	5.932	5.939	0.014	0.229
Mean (4)	**39.35**	**0.39**	**0.83**	**0.08**	<dl	<dl	**39.55**	**19.94**	<dl	**0.08**	**100.18**	**2.989**	**0.017**	**-**	**0.072**	**0.003**	**3.078**	**0.003**	**0.914**	**0.914**	**3.994**	**3.002**	-	**0.005**	**3.006**	**5.896**	**6.012**	**5.954**	**-0.116**	**-1.943**
180Witt-1	38.03	0.08	0.54	0.06	<dl	0.02	41.68	20.27	<dl	0.21	100.89	2.902	0.004	-	0.047	0.002	2.952	0.002	0.967	0.967	3.922	3.065	-	0.013	3.078	5.906	6.156	6.031	-0.250	-4.153
180Witt-2	37.88	<dl	0.87	0.06	<dl	0.04	41.89	20.45	<dl	0.27	101.45	2.870	-	-	0.075	0.002	2.945	0.002	0.965	0.965	3.912	3.071	-	0.016	3.088	5.920	6.175	6.047	-0.255	-4.219
180Witt-3	37.59	0.19	0.62	0.04	<dl	0.03	40.57	19.39	<dl	1.04	99.47	2.922	0.009	-	0.055	0.002	2.986	0.002	0.959	0.959	3.947	2.988	-	0.065	3.053	5.922	6.106	6.014	-0.185	-3.072
180Witt-4	37.00	<dl	<dl	0.05	<dl	<dl	41.86	20.25	<dl	0.21	99.38	2.875	-	-	-	0.002	2.875	0.002	0.989	0.989	3.867	3.120	-	0.013	3.133	5.848	6.266	6.057	-0.418	-6.904
180Witt-5	37.94	0.22	<dl	<dl	<dl	<dl	41.78	20.42	<dl	0.09	100.45	2.908	0.010	-	-	-	2.918	-	0.974	0.974	3.892	3.102	-	0.006	3.108	5.840	6.215	6.028	-0.375	-6.226
180Witt-6	37.08	0.11	<dl	<dl	<dl	0.08	40.89	19.90	<dl	0.31	98.41	2.907	0.005	-	-	-	2.912	-	0.975	0.976	3.888	3.092	-	0.020	3.112	5.841	6.223	6.032	-0.383	-6.342
180Witt-7	37.18	0.10	<dl	<dl	<dl	0.05	41.65	19.95	<dl	0.34	99.27	2.900	0.005	-	-	-	2.905	-	0.988	0.988	3.893	3.085	-	0.022	3.107	5.869	6.214	6.042	-0.344	-5.699
180Witt-8	36.88	0.08	<dl	0.05	<dl	0.05	41.66	20.04	<dl	0.35	99.11	2.880	0.004	-	-	0.002	2.884	0.002	0.989	0.989	3.876	3.102	-	0.022	3.124	5.857	6.248	6.053	-0.391	-6.468
180Witt-9	37.57	0.14	<dl	<dl	<dl	<dl	41.46	20.22	<dl	0.26	99.69	2.904	0.006	-	-	-	2.910	-	0.974	0.976	3.886	3.098	-	0.016	3.114	5.838	6.228	6.033	-0.390	-6.461
180Witt-10	37.51	0.18	<dl	0.06	<dl	0.03	40.96	20.21	<dl	0.35	99.30	2.903	0.008	-	-	0.003	2.911	0.003	0.964	0.964	3.878	3.101	-	0.022	3.122	5.808	6.245	6.026	-0.437	-7.245
Mean (10)	**38.00**	**0.19**	**0.77**	**0.04**	<dl	**0.02**	**40.90**	**20.06**	<dl	**0.26**	**99.87**	**2.923**	**0.009**	-	**0.033**	**0.002**	**2.965**	**0.002**	**0.957**	**0.957**	**3.924**	**3.060**	-	**0.016**	**3.076**	**5.874**	**6.152**	**6.013**	**-0.278**	**-4.611**
	Aikinite ($PbCuBiS_3$) (wt.%)											Formula (to 6 atoms)																		
180Aik-1	10.86	<dl	0.07	<dl	36.08	0.03	36.07	15.87	<dl	0.90	99.88	1.000	-	1.019	0.008	-	1.007	1.019	1.010	1.010	3.036	2.897	-	0.066	2.964	6.083	5.927	6.005	0.156	2.592
180Aik-2	10.87	<dl	0.19	<dl	35.11	0.03	36.67	16.01	<dl	0.97	99.85	0.995	-	0.986	0.020	-	1.015	0.986	1.021	1.021	3.022	2.906	-	0.072	2.978	6.071	5.955	6.013	0.116	1.922
180Aik-3	10.98	<dl	0.31	<dl	35.22	<dl	36.95	15.82	0.02	0.99	100.28	1.005	-	0.989	0.032	-	1.037	0.989	1.029	1.029	3.055	2.871	0.001	0.073	2.945	6.135	5.889	6.012	0.246	4.085
180Aik-4	10.59	<dl	0.81	<dl	36.22	<dl	37.52	16.51	<dl	0.42	102.06	0.947	-	0.994	0.082	-	1.029	0.994	1.021	1.021	3.044	2.927	-	0.030	2.956	6.161	5.913	6.037	0.248	4.104
180Aik-5	10.71	<dl	0.42	0.06	35.51	<dl	37.27	16.23	<dl	0.48	100.68	0.974	-	0.990	0.044	0.003	1.018	0.993	1.030	1.030	3.041	2.924	-	0.035	2.959	6.139	5.918	6.028	0.221	3.662
180Aik-6	10.70	<dl	0.78	0.13	35.37	<dl	37.50	16.28	<dl	0.46	101.23	0.965	-	0.978	0.080	0.006	1.045	0.984	1.028	1.028	3.057	2.909	-	0.034	2.943	6.178	5.885	6.032	0.292	4.844
180Aik-7	10.66	<dl	0.86	0.14	35.86	0.03	37.38	16.86	<dl	0.32	102.11	1.101	-	1.136	0.101	0.008	1.202	1.144	1.174	1.174	3.520	3.453	-	0.027	3.480	7.114	6.959	7.037	0.155	2.198
180Aik-8	10.75	<dl	0.75	<dl	35.29	0.03	37.56	16.91	<dl	0.33	101.62	1.113	-	1.120	0.088	-	1.201	1.120	1.182	1.182	3.504	3.469	-	0.027	3.496	7.076	6.993	7.035	0.084	1.190
180Aik-9	10.92	<dl	<dl	0.06	35.22	<dl	36.88	16.52	<dl	0.44	100.04	1.157	-	1.145	-	0.004	1.157	1.148	1.188	1.188	3.493	3.470	-	0.037	3.507	7.018	7.014	7.016	0.004	0.053
180Aik-10	10.69	<dl	<dl	0.05	35.72	<dl	36.60	15.70	<dl	0.98	99.73	1.157	-	1.185	-	0.003	1.157	1.188	1.204	1.204	3.549	3.366	-	0.086	3.451	7.145	6.903	7.024	0.242	3.445
180Aik-11	10.54	<dl	<dl	0.06	35.20	<dl	36.73	15.99	<dl	1.07	99.59	1.133	-	1.161	-	0.004	1.133	1.165	1.201	1.201	3.499	3.408	-	0.092	3.501	7.066	7.002	7.034	0.064	0.915
Mean (11)	**10.75**	<dl	**0.53**	**0.04**	**35.53**	**0.01**	**37.01**	**16.25**	**0.00**	**0.67**	**100.64**	**1.050**	-	**1.064**	**0.041**	**0.002**	**1.091**	**1.066**	**1.099**	**1.099**	**3.256**	**3.145**	**0.000**	**0.053**	**3.198**	**6.562**	**6.396**	**6.479**	**0.166**	**2.637**

Note: <dl, below minimum limit of detection.

Table S3. EPMA data for Bi-chalcogenides of the Zhibula Cu skarn.

	Tetradymite (Bi_2Te_2S) (wt.%)									Formula (to 5 atoms)											
	Cu	Ag	Cd	Pb	Bi	S	Te	Se	Total	Cu	Ag	Pb	Cd	Cu+Ag+Fe	Pb+Cd	Bi	Total M	S	Te	Se	S(+Te+Se)
180-1	0.12	<dl	0.06	0.06	59.11	5.00	35.67	1.08	101.10	0.013	-	0.002	0.004	0.013	0.005	1.925	1.943	1.061	1.903	0.093	3.057
180-2	0.06	0.10	<dl	0.08	58.02	4.45	37.21	1.18	101.09	0.006	0.006	0.003	-	0.013	0.003	1.915	1.930	0.957	2.011	0.103	3.070
180-3	0.05	<dl	<dl	0.13	57.80	4.43	37.13	1.24	100.80	0.006	-	0.004	-	0.006	0.004	1.913	1.923	0.956	2.012	0.109	3.077
180-4	0.09	<dl	<dl	<dl	59.13	5.02	35.75	1.05	101.04	0.010	-	-	-	0.010	-	1.926	1.936	1.066	1.907	0.091	3.064
180-5	0.09	<dl	<dl	0.12	59.05	4.56	35.69	2.14	101.65	0.010	-	0.004	-	0.010	0.004	1.925	1.939	0.970	1.906	0.185	3.061
180-6	0.09	<dl		0.08	59.51	5.05	34.33	0.74	99.80	0.009	-	0.003	-	0.009	0.003	1.971	1.983	1.090	1.862	0.065	3.017
180-7	0.12	<dl	0.06	0.06	59.11	5.00	35.67	1.08	101.10	0.013	-	0.002	0.004	0.013	0.005	1.925	1.943	1.061	1.903	0.093	3.057
180-8	<dl	0.12	0.14	<dl	58.99	5.00	35.67	1.47	101.39	-	0.008	-	0.009	0.008	0.009	1.910	1.926	1.056	1.892	0.126	3.074
180-9	0.07	0.22	0.10	<dl	57.63	4.61	34.92	1.54	99.09	0.007	0.014	-	0.006	0.022	0.006	1.924	1.952	1.004	1.909	0.136	3.048
180-10	0.10	0.17	<dl	0.10	57.60	4.72	34.61	1.53	98.82	0.011	0.011	0.003	-	0.022	0.003	1.922	1.948	1.026	1.891	0.136	3.052
180-11	0.08	0.13	<dl	0.04	58.21	4.75	34.61	1.43	99.26	0.009	0.008	0.001	-	0.017	0.001	1.938	1.956	1.030	1.887	0.126	3.044
180-12	<dl	0.13	0.11	0.04	58.64	4.56	35.53	1.49	100.50	-	0.008	0.001	0.007	0.008	0.008	1.942	1.959	0.984	1.927	0.130	3.041
180-13	0.08	<dl	<dl	<dl	58.31	4.81	34.90	1.48	99.57	0.008	-	-	-	0.008	-	1.931	1.940	1.038	1.893	0.129	3.060
180-14	0.13	<dl	0.05	0.05	56.83	4.16	35.25	2.03	98.51	0.015	-	0.002	0.003	0.015	0.005	1.925	1.945	0.917	1.956	0.182	3.055
180-15	0.10	<dl	0.11	0.05	57.88	4.28	35.33	2.17	99.91	0.010	-	0.002	0.007	0.010	0.008	1.931	1.950	0.929	1.930	0.191	3.050

Note: <dl, below minimum limit of detection.

Table S4. EPMA data for Au-Ag-tellurides of the Zhibula Cu skarn.

	Hessite (Ag_2Te) (wt.%)									Formula (to 3 atoms)									
	S	Se	Cu	Ag	Hg	Te	Bi	Au	Total	S	Se	Te	S+Se+Te	Cu	Ag	Hg	Bi	Au	Total M
8Hs-1	0.04	0.06	0.37	63.82	0.12	38.13	<dl	<dl	102.53	0.005	0.002	0.997	1.004	0.019	1.974	0.002	-	-	1.996
8Hs-2	0.11	0.06	<dl	59.35	0.15	40.83	0.04	<dl	100.53	0.011	0.003	1.097	1.111	0.000	1.886	0.003	0.001	-	1.889
8Hs-3	0.06	0.05	0.22	63.31	<dl	37.37	<dl	<dl	100.99	0.006	0.002	0.992	1.000	0.012	1.988	-	-	-	2.000
8Hs-4	0.07	0.09	0.42	63.57	0.22	37.44	<dl	0.15	101.97	0.007	0.004	0.984	0.995	0.022	1.976	0.004	-	0.003	2.005
8Hs-5	0.07	0.10	0.28	62.94	0.09	37.66	0.05	0.32	101.51	0.008	0.004	0.996	1.008	0.015	1.969	0.002	0.001	0.006	1.992
8Hs-6	0.05	0.19	0.53	63.72	0.14	37.65	<dl	<dl	102.28	0.005	0.008	0.985	0.998	0.028	1.972	0.002	-	-	2.002
8Hs-7	0.10	0.00	<dl	63.79	<dl	38.36	0.07	<dl	102.33	0.011	-	1.007	1.018	-	1.981	-	0.001	-	1.982
374Hs-1	0.14	0.26	<dl	63.36	0.22	36.23	<dl	0.17	100.38	0.015	0.011	0.967	0.993	-	2.000	0.004	-	0.003	2.007
374Hs-2	0.18	0.14	<dl	63.71	0.15	37.77	<dl	0.21	102.16	0.019	0.006	0.991	1.016	-	1.978	0.003	-	0.004	1.984
374Hs-3	0.20	0.12	<dl	64.14	0.12	37.91	<dl	0.34	102.82	0.021	0.005	0.988	1.014	-	1.978	0.002	-	0.006	1.986
374Hs-4	0.12	0.23	<dl	63.81	0.13	36.85	0.07	<dl	101.21	0.012	0.010	0.976	0.998	-	1.999	0.002	0.001	0.000	2.002

Note: <dl, below minimum limit of detection.

Table S5. EPMA data for carrollite of the Zhibula Cu skarn.

	Carrollite ($CuCo_{1.5}Ni_{0.5}S_4$) (wt.%)										Formula (to 7 atoms)										
	S	**Pb**	**Se**	**Fe**	**Cu**	**Ni**	**Co**	**Te**	**Bi**	**Total**	**S**	**Se**	**Te**	**S+Se+Te**	**Pb**	**Fe**	**Cu**	**Ni**	**Co**	**Bi**	**Total M**
372Car?-1	41.37	0.11	0.03	2.44	14.31	11.25	30.45	0.03	0.12	100.11	3.980	0.001	0.001	3.982	0.002	0.135	0.695	0.591	1.594	0.002	3.018
372Car?-2	40.45	0.07	<dl	4.07	18.18	10.03	26.07	0.05	0.16	99.08	3.950	-	0.001	3.952	0.001	0.228	0.896	0.535	1.386	0.002	3.048
372Car?-3	41.09	0.09	<dl	2.53	15.42	10.88	29.71	0.07	0.10	99.88	3.968	-	0.002	3.970	0.001	0.140	0.751	0.574	1.561	0.001	3.030
Mean (3)	**40.97**	**0.09**	**0.03**	**3.01**	**15.97**	**10.72**	**28.74**	**0.05**	**0.12**	**99.69**	**3.966**	**0.000**	**0.001**	**3.968**	**0.001**	**0.168**	**0.781**	**0.567**	**1.514**	**0.002**	**3.032**
8Car?-1	42.19	0.14	0.04	0.06	12.75	9.93	36.23	0.05	0.11	101.50	3.998	0.002	0.001	4.001	0.002	0.003	0.609	0.514	1.868	0.002	2.999
8Car?-2	41.92	0.12	0.05	0.07	12.63	9.91	36.24	0.07	0.10	101.11	3.990	0.002	0.002	3.994	0.002	0.004	0.607	0.515	1.877	0.001	3.006
8Car?-3	42.31	0.08	0.08	0.05	12.31	10.96	35.07	0.02	0.17	101.17	4.017	0.003	-	4.021	0.001	0.003	0.590	0.569	1.812	0.002	2.979
8Car?-4	42.01	0.10	<dl	0.09	12.35	10.85	35.09	0.02	0.16	100.67	4.009	-	-	4.009	0.001	0.005	0.595	0.566	1.822	0.002	2.991
8Car?-5	42.18	0.16	0.05	0.07	12.16	11.12	34.80	0.02	0.13	100.69	4.020	0.002	0.001	4.023	0.002	0.004	0.585	0.579	1.805	0.002	2.977
Mean (5)	**42.12**	**0.12**	**0.06**	**0.07**	**12.44**	**10.55**	**35.49**	**0.04**	**0.13**	**101.03**	**4.007**	**0.002**	**0.001**	**4.009**	**0.002**	**0.004**	**0.597**	**0.549**	**1.837**	**0.002**	**2.991**

Note: <dl, below minimum limit of detection.

Table S6. EPMA data for pyrrhotite and pentlandite of the Zhibula Cu skarn.

	Pyrrhotite ($Fe_{(1-x)}S$ (x=0-0.17)) (wt.%)					Formula (to 2 atoms; at S=1)							
	S	**Fe**	**Ni**	**Co**	**Total**	**Fe**	**Ni**	**Co**	**Total M**	**S**	**M/S**	**x**	**1/2x**
321Po-1	38.43	60.67	0.90	<dl	100.00	0.906	0.008	-	0.914	1.000	0.914	0.086	5.812
321Po-2	38.85	58.11	0.84	<dl	97.79	0.859	0.007	-	0.866	1.000	0.866	0.134	3.722
321Po-3	38.07	60.36	0.90	<dl	99.32	0.910	0.008	-	0.918	1.000	0.918	0.082	6.084
321Po-4	38.90	58.69	0.91	<dl	98.51	0.866	0.008	-	0.874	1.000	0.874	0.126	3.960
321Po-5	38.99	60.21	0.71	<dl	99.91	0.887	0.006	-	0.892	1.000	0.892	0.108	4.646
321Po-6	39.71	59.95	0.63	<dl	100.29	0.867	0.005	-	0.872	1.000	0.872	0.128	3.901
321Po-7	39.36	59.56	0.85	<dl	99.76	0.869	0.007	-	0.876	1.000	0.876	0.124	4.018
321Po-8	38.32	59.11	0.87	<dl	98.30	0.885	0.007	-	0.893	1.000	0.893	0.107	4.659
321Po-9	38.34	59.80	0.86	<dl	99.00	0.895	0.007	-	0.903	1.000	0.903	0.097	5.129
321Po-10	38.54	59.78	0.74	<dl	99.06	0.890	0.006	-	0.897	1.000	0.897	0.103	4.835
321Po-11	38.32	59.51	0.88	0.15	98.86	0.892	0.007	0.001	0.900	1.000	0.900	0.100	5.008
321Po-12	38.26	59.25	0.89	0.13	98.52	0.889	0.007	0.001	0.897	1.000	0.897	0.103	4.874

	Pentlandite ($(Fe,Ni)_9S_8$) (wt.%)									Formula (to 17 atoms)									
	S	**Se**	**Fe**	**Ag**	**Ni**	**Co**	**Te**	**Bi**	**Total**	**S**	**Se**	**Te**	**S+Se+Te**	**Fe**	**Ag**	**Ni**	**Co**	**Bi**	**Total M**
321Pn-1	34.11	0.05	35.14	<dl	27.00	3.22	<dl	0.20	99.73	8.185	0.005	-	8.190	4.842	-	3.540	0.420	0.007	8.810
321Pn-2	34.03	0.08	34.65	0.06	27.21	3.16	<dl	0.17	99.35	8.196	0.008	-	8.203	4.792	0.002	3.581	0.415	0.006	8.797
321Pn-3	34.66	0.05	32.97	<dl	28.71	3.01	0.03	0.07	99.51	8.304	0.005	0.002	8.311	4.535	-	3.759	0.392	0.003	8.689
321Pn-4	33.51	0.06	31.71	<dl	29.59	2.61	0.03	0.18	97.69	8.212	0.006	0.002	8.220	4.462	-	3.963	0.348	0.007	8.780
321Pn-5	34.92	0.09	41.69	<dl	22.17	1.30	<dl	0.13	100.30	8.275	0.009	-	8.283	5.673	-	2.871	0.167	0.005	8.717

Note: <dl, below minimum limit of detection

Table S7. EPMA data for sphalerite and galena of the Zhibula Cu skarn.

	Sphalerite (ZnS) (wt.%)															Formula (to 2 atoms)									
	S	**Pb**	**Cd**	**Se**	**Cu**	**Fe**	**Mn**	**Ag**	**In**	**Te**	**Bi**	**Hg**	**Zn**	**Co**	**Tl**	**Total**	**S**	**Se**	**Pb**	**Cd**	**Fe**	**Cu**	**Ag**	**Zn**	**Co**	**Bi**
321Sp	33.84	0.08	1.34	<dl	0.11	12.59	<dl	<dl	<dl	<dl	0.12	<dl	51.24	0.08	0.15	99.61	1.014	-	-	0.011	0.216	0.002	-	0.753	0.001	0.001
374Sp	30.96	0.11	2.02	0.13	3.23	1.96	<dl	<dl	0.07	<dl	0.16	0.12	57.88	0.07	0.21	96.92	0.985	0.002	0.001	0.018	0.036	0.052	-	0.903	0.001	0.001
355Sp-1	33.41	0.07	0.23	<dl	0.26	1.11	0.07	<dl	<dl	<dl	0.15	<dl	64.10	0.25	0.22	99.87	1.013	-	0.000	0.002	0.019	0.004	-	0.954	0.004	0.001
355Sp-2	33.45	0.09	0.22	<dl	0.20	1.03	0.08	<dl	0.02	<dl	0.13	0.09	64.55	0.28	0.28	100.44	1.011	-	0.000	0.002	0.018	0.003	-	0.957	0.005	0.001
355Sp-3	33.55	0.08	0.23	0.06	0.20	1.05	0.07	<dl	<dl	<dl	0.14	<dl	64.83	0.28	0.23	100.72	1.010	0.001	0.000	0.002	0.018	0.003	-	0.958	0.005	0.001
355Sp-4	32.91	0.08	0.26	<dl	1.10	1.86	0.09	<dl	0.03	<dl	0.14	<dl	62.74	0.24	0.09	99.53	1.003	-	0.000	0.002	0.033	0.017	-	0.938	0.004	0.001
355Sp-5	33.09	0.07	0.18	<dl	0.35	1.15	0.09	0.06	0.03	<dl	0.15	0.13	63.82	0.26	0.28	99.67	1.009	-	0.000	0.002	0.020	0.005	0.001	0.954	0.004	0.001
	Galena (PbS) (wt.%)																Formula (to 2 atoms)									
355Gn-1	11.21	82.40	0.16	0.17	0.31	-	-	1.23	-	0.05	2.50	-	-	<dl	-	98.03	0.897	0.005	1.021	0.004	-	0.012	0.029	-	-	0.031
355Gn-2	11.02	82.54	<dl	0.23	<dl	-	-	1.14	-	0.05	2.43	-	-	<dl	-	97.41	0.895	0.008	1.038	-	-	-	0.028	-	-	0.030
355Gn-3	11.08	83.46	<dl	0.20	0.44	-	-	1.04	-	0.04	2.01	-	-	<dl	-	98.28	0.889	0.007	1.036	-	-	0.018	0.025	-	-	0.025

Note: <dl, below minimum limit of detection

Table S8. LA-ICP-MS data for bornite and chalcopyrite in the Zhibula Cu skarn (concentrations in ppm)

	V	Cr	Mn	Co	Ni	Zn	Ga	Ga	As	Se	Mo	Ag	Cd	In	Sn	Sb	Te	Ba	W	Ir	Au	Hg	Tl	Pb^{204}	Pb^{208}	Bi
8Bn-1	0.08	1.4	4.9	0.14	0.30	5.6	0.44	0.39	0.79	210	0.56	674	0.23	2.0	1.1	0.25	137	83	0.43	<dl	0.06	0.09	0.07	8.9	234	978
8Bn-2	1.4	2.0	1.3	0.08	0.19	4.4	6.0	0.08	0.62	204	0.28	338	0.47	1.4	1.2	1.1	63	25	3.7	0.02	0.02	0.08	0.12			885
8Bn-3	0.07	1.1	1.1	0.05	0.00	1.9	0.18	<dl	0.56	209	0.21	381	0.20	1.8	1.4	0.08	55	45	0.29	<dl	0.03	0.06	0.06	0.20	8.1	980
8Bn-4	0.10	3.4	2.3	0.04	0.12	9.2	0.99	0.05	0.71	204	0.72	381	0.27	1.8	1.3	0.13	99	237	0.98	<dl	0.05	0.09	0.03	2.0	46	939
8Bn-5	0.04	0.78	1.2	0.03	<dl	7.2	0.24	0.36	0.46	210	0.32	362	0.18	1.7	1.3	0.07	104	45	0.22	0.03	0.05	0.05	0.03	0.76	19	846
8Bn-6	0.07	1.0	1.5	0.02	0.09	2.7	0.20	0.04	0.59	208	0.75	412	0.31	1.9	2.0	0.10	136	63	0.20	<dl	0.15	0.07	0.03	0.62	20	967
8Bn-7	0.03	1.0	2.5	0.03	0.17	1.9	0.29	0.10	0.53	189	0.36	444	0.29	2.3	1.1	0.10	41	47	0.39	0.04	0.03	0.07	0.13	1.5	20	965
8Bn-8	0.07	9.6	4.2	0.08	0.00	7.6	1.5	0.05	1.2	283	0.41	264	1.3	2.3	1.5	0.67	5.2	396	2.8	<dl	0.05	0.09	0.01	2.4	29	981
8Bn-9	0.07	1.5	3.1	0.19	0.20	2.2	0.30	<dl	0.68	143	0.58	283	0.23	1.8	1.5	0.29	3.0	99	0.92	<dl	0.06	0.09	0.08	1.1	22	959
8Bn-10	0.07	35	8.9	0.21	0.49	8.6	1.5	0.17	1.4	243	0.59	506	0.57	1.9	1.8	0.80	23	450	0.43	<dl	0.05	0.16	0.09	5.0	89	1117
8Bn-11	0.46	16	7.7	0.09	<dl	3.0	0.22	0.15	1.1	232	0.53	565	<dl	2.0	2.0	0.20	31	77	0.72	<dl	0.05	0.19	0.17			1020
8Bn-12	1.9	16	4.1	0.07	0.46	3.7	0.43	<dl	2.3	201	0.46	502	0.44	1.8	2.6	2.3	9.4	143	1.2	<dl	0.04	0.11	0.04	25	438	940
8Bn-13	0.06	61	7.0	0.15	0.17	17	1.6	<dl	0.80	196	0.72	458	0.45	1.6	1.9	0.68	28	463	1.7	<dl	<dl	0.09	0.01	10	182	979
8Bn-14	0.07	2.7	2.8	0.07	<dl	2.4	0.26	0.10	0.74	224	0.67	467	0.29	2.9	1.7	0.16	23	211	0.89	<dl	<dl	0.10	0.03	45	761	1323
8Bn-15	0.08	16	1.2	0.12	0.19	4.3	0.32	<dl	0.66	179	1.0	343	0.23	2.1	1.2	0.11	15	94	0.37	<dl	0.02	0.14	0.02	0.37	7.6	1266
8Bn-16	0.13	11	0.90	0.05	<dl	11	0.23	0.13	0.76	214	0.15	320	0.28	2.2	1.7	0.23	38	99	0.31	<dl	0.11	0.11	0.02	0.60	11	1291
8Bn-17	0.33	2.6		0.15	0.29	4.8	0.38	0.10	0.61	232	0.78	441	0.11	3.3	2.2	0.48	112	119	0.36	<dl	1.61	0.09	0.03	1.4	10	1135
8Bn-18	0.05	1.0	1.9	0.07	0.35	2.0	0.30	0.10	0.60	214	0.46	901	0.10	2.0	1.8	0.11	283	80	0.27	<dl	0.05	0.09	0.08	1.9	19	978
8Bn-19	0.06	1.1	4.5	0.11	0.15	6.0	2.1	0.22	0.51	198	0.64	503	0.50	1.9	1.2	0.09	125	751	0.29	<dl	0.05	0.08	0.04	1.4	21	942
8Bn-20	0.05	4.5	2.4	0.06	<dl	2.9	0.42	0.06	0.62	214	0.58	356	0.12	1.7	1.7	0.12	55	255	0.45	0.02	0.05	0.09	0.03	1.3	17	924
Mean	0.26	9.4	3.3	0.09	0.16	5.4	0.89	0.10	0.82	210	0.54	445	0.33	2.0	1.6	0.40	69	189	0.84	0.01	0.13	0.10	0.06	6.1	109	1021
SD	0.50	15	2.4	0.05	0.16	3.9	1.3	0.11	0.43	27	0.21	146	0.28	0.44	0.42	0.53	67	189	0.90	0.01	0.35	0.03	0.04	11	197	134
Max.	1.9	61	8.9	0.21	0.49	17	6.0	0.39	2.3	283	1.0	901	1.3	3.3	2.6	2.3	283	751	3.7	0.04	1.6	0.19	0.17	45	761	1323
Min.	0.03	0.78	0.90	0.02	<dl	1.9	0.18	<dl	0.46	143	0.15	264	<dl	1.4	1.1	0.07	3.0	25	0.20	<dl	<dl	0.05	0.01	0.20	7.6	846
374Bn-1	0.04	3.3	0.32	0.26	0.24	2.3	0.07	0.02	1.8	510	0.47	445	0.26	0.44	0.17	0.11	15	<dl	<dl	<dl	0.04	0.04	<dl	1.0	21	13793
374Bn-2	4.5	2.8		0.06	0.24	2.3	0.63	0.59	11	477	0.64	427	0.92	0.19	0.74	1.7	21	1.2	0.08	<dl	0.03	0.04	0.02	3.0	45	17348
374Bn-3	0.06	4.0	0.42	0.26	0.29	1.9	0.05	0.02	0.70	543	0.38	506	0.23	0.04	0.23	0.16	21	<dl	0.12	<dl	0.01	0.06	0.03	0.47	16	17156
374Bn-4	0.13	4.0	7.3	0.30	0.24	13	0.07	0.15	0.85	502	0.54	461	1.4	0.03	1.0	0.16	23	<dl	0.15	0.01	0.04	0.06	0.01	14	257	17885
374Bn-5	4.5	7.8		0.50	0.41	4.5	1.3	1.6	15	542	0.65	477	0.53	0.25	6.7	0.63	55	1.5	3.0	<dl	<dl	0.09	0.02	15	238	23903
374Bn-6	1.4	7.3		0.45	0.24	1.6	0.14	0.26	8.2	472	0.32	510	0.17	0.14	0.47	0.87	44	0.79	0.13	0.01	0.04	0.06	0.02	43	753	25384
374Bn-7	0.04	4.3	0.43	0.32	0.20	1.5	0.04	0.10	0.70	470	0.51	622	0.27	0.16	0.20	0.22	102	<dl	0.07	<dl	0.05	0.05	0.03	21	399	24715
374Bn-8	0.05	4.2	0.43	0.43	0.18	2.1	0.02	<dl	0.71	515	0.38	563	0.55	0.15	0.19	0.15	100	0.29	0.17	<dl	<dl	0.06	<dl	10	160	27467
374Bn-9	0.05	6.2	0.43	0.29	0.35	1.9	0.23	0.05	0.71	511	0.58	497	0.29	0.15	0.21	0.16	61	0.75	<dl	<dl	0.04	0.05	<dl	9.5	167	25123
Mean	1.2	4.9	1.6	0.32	0.27	3.4	0.28	0.31	4.5	505	0.50	501	0.52	0.17	1.1	0.47	49	0.51	0.41	0.00	0.03	0.06	0.01	13	228	21419

SD	1.9	1.8	2.8	0.13	0.07	3.7	0.42	0.52	5.6	28	0.12	61	0.41	0.12	2.1	0.54	33	0.59	0.96	0.01	0.02	0.01	0.01	13	233	4853
Max.	4.5	7.8	7.3	0.50	0.41	13	1.3	1.6	15	543	0.65	622	1.4	0.44	6.7	1.7	102	1.5	3.0	0.01	0.05	0.09	0.03	43	753	27467
Min.	0.04	2.8	0.32	0.06	0.18	1.5	0.02	<dl	0.70	470	0.32	427	0.17	0.03	0.17	0.11	15	<dl	<dl	<dl	<dl	0.04	<dl	0.47	16	13793
374Cp-1	0.09	7.4	0.68	4.3	0.19	4.9	0.12	0.10	1.1	197	0.09	0.74	0.30	6.2	0.36	0.26	3.7	<dl	<dl	<dl	0.06	0.12	<dl	0.39	1.5	1.4
374Cp-2	0.04	6.5	0.61	5.5	0.41	3.3	0.07	0.18	1.2	185	0.08	1.4	0.35	5.8	0.34	0.24	1.8	1.1	<dl	0.01	0.05	0.09	0.03	0.29	0.20	0.33
374Cp-3	0.06	7.4	0.80	6.1	0.27	12	0.14	0.04	1.0	234	0.10	2.1	1.2	5.7	0.37	0.29	5.0	<dl	0.04	<dl	0.00	0.11	0.02	0.30	0.26	0.11
374Cp-4	0.06	6.6	0.60	4.6	0.33	4.5	0.02	0.09	0.92	174	0.16	2.5	0.26	5.7	0.27	0.22	3.3	<dl	<dl	0.01	0.14	0.09	0.04	0.28	2.3	13
374Cp-5	0.12	6.7	0.62	3.4	0.36	6.7	0.03	0.13	0.97	161	0.12	7.3	0.46	6.0	0.38	0.25	2.3	1.2	<dl	<dl	0.04	0.08	0.05	0.90	10	
374Cp-6	1.6	7.1		2.4	0.46	3.6	0.20	0.17	2.1	169	<dl	1.7	0.28	6.1	0.85	0.20	3.4	<dl	0.09	0.03	<dl	0.10	0.02	1.5	16	2.3
374Cp-7	0.12	7.1	0.67	1.6	<dl	3.1	<dl	0.10	1.1	165	0.43	6.2	0.41	6.3	0.32	0.25	4.1	<dl	<dl	0.05	0.06	0.11	0.03	0.74	5.3	
374Cp-8	0.23	8.3		2.3	0.33	3.7	0.12	0.13	0.96	159	0.11	7.7	1.6	5.8	0.32	0.21	3.2	1.1	0.10	<dl	0.14	0.10	0.02	0.40	7.3	75
Mean	0.29	7.1	0.66	3.8	0.29	5.2	0.09	0.12	1.2	180	0.14	3.7	0.61	6.0	0.40	0.24	3.4	0.43	0.03	0.01	0.06	0.10	0.03	0.60	5.3	15
SD	0.54	0.58	0.07	1.6	0.14	2.9	0.07	0.04	0.39	25	0.13	2.8	0.51	0.23	0.18	0.03	1.0	0.59	0.04	0.02	0.05	0.01	0.01	0.43	5.5	30
Max.	1.6	8.3	0.80	6.1	0.46	12	0.20	0.18	2.1	234	0.43	7.7	1.6	6.3	0.85	0.29	5.0	1.2	0.10	0.05	0.14	0.12	0.05	1.5	16	75
Min.	0.04	6.5	0.60	1.6	<dl	3.1	<dl	0.04	0.92	159	<dl	0.74	0.26	5.7	0.27	0.20	1.8	<dl	<dl	<dl	<dl	0.08	<dl	0.28	<dl	<dl
372Cp-1	0.07	6.4	22.0	1.9	0.31	7.5	0.11	0.03	0.81	128	<dl	0.87	<dl	6.0	0.26	0.19	2.0	<dl	0.90	<dl	0.05	0.08	0.02	0.93	5.4	4.2
372Cp-2	0.10	6.1	22.7	1.7	0.28	3.2	0.08	0.07	0.94	126	0.10	0.23	0.24	6.1	0.28	0.22	1.0	<dl	<dl	0.03	0.07	0.08	0.07	0.28	5.4	2.9
372Cp-3	0.17	6.4		3.7	1.2	22	0.09	0.09	1.2	136	0.12	0.69	0.27	5.0	0.28	0.34	1.2	2.0	1.3	<dl	0.04	0.10	0.03	0.43	2.5	3.0
372Cp-4	0.08	5.7	35.0	0.60	0.43	19	0.15	0.03	0.85	121	0.11	2.4	0.18	5.5	0.27	0.21	0.67	0.96	6.5	<dl	0.08	0.14	0.05	1.4	18	6.3
372Cp-5	0.52	5.9		1.2	0.37	16	0.21	0.42	0.91	126	1.4	2.2	0.09	5.2	0.32	0.29	1.6	2.0		<dl	0.05	0.07	0.09	1.8	20	10
372Cp-6	1.7	5.1		2.7	0.82	27	0.21	0.03	2.0	119	0.47	1.9	0.22	4.7	0.77	0.92	0.31	1.0	41	<dl	0.08	0.08	0.04	1.8	21	11
372Cp-7	0.81	5.0		6.4	1.2	63	0.69	1.4	0.86	112	0.17	1.2	0.31	5.2	0.27	0.17	0.73	2.9	0.03	<dl	0.07	0.09	0.03	0.28	2.4	2.0
372Cp-8	1.3	8.7		1.8	0.46	23	0.08	<dl	0.83	123		2.9	0.20	5.3	0.48	0.47	1.3	3.4		0.01	0.12	0.08	0.01	2.1	17	8.7
372Cp-9	0.09	6.6	61	0.93	0.27	2.1	0.05	0.03	0.71	128	0.11	3.5	0.21	5.1	0.22	0.20	0.84	<dl	<dl	<dl	0.18	0.09	0.06	0.41	3.2	3.4
372Cp-10	0.65	5.3	38	2.0	0.26	2.4	0.19	0.10	0.77	124	0.17	0.44	0.33	5.9	0.59	0.21	0.67	<dl	7.0	0.01	0.05	0.08	0.06	0.38	2.8	1.9
372Cp-11	0.07	5.0	6.1	1.5	0.21	5.0	0.05	0.06	0.76	103	0.11	0.17	0.23	5.3	0.34	0.16	1.3	<dl	0.20	<dl	0.09	0.08	0.04	0.22	1.3	0.81
372Cp-12	0.49	5.5	17	2.1	0.23	3.3	0.09	0.09	0.98	132	0.21	0.37	0.36	5.8	0.27	0.21	1.8	2.5	0.04	<dl	0.07	0.10	0.07	0.40	1.1	0.88
Mean	0.50	6.0	29	2.2	0.50	16	0.17	0.20	0.97	123	0.27	1.4	0.22	5.4	0.36	0.30	1.1	1.2	5.7	0.00	0.08	0.09	0.05	0.88	8.4	4.5
SD	0.53	1.0	18	1.5	0.36	17	0.17	0.41	0.36	9.0	0.39	1.1	0.10	0.43	0.17	0.21	0.51	1.3	13	0.01	0.04	0.02	0.02	0.72	8.1	3.5
Max.	1.7	8.7	61	6.4	1.2	63	0.69	1.4	2.0	136	1.4	3.5	0.36	6.1	0.77	0.92	2.0	3.4	41	0.03	0.18	0.14	0.09	2.1	21	11
Min.	0.07	5.0	6.1	0.60	0.21	2.1	0.05	<dl	0.71	103	<dl	0.17	<dl	4.7	0.22	0.16	0.31	<dl	<dl	<dl	0.04	0.07	0.01	0.22	1.1	0.81
176Cp-1	0.18	2.2	15	2.3	0.15	3.0	0.04	0.15	1.3	130	0.31	1.8	0.62	1.7	0.48	0.16	1.1	5.0	0.17	0.07	0.08	0.21	0.03	0.55	0.46	1.8
176Cp-2	1.3	2.8		8.4	4.4	44	0.31	0.24	1.4	126	<dl	4.0	0.71	1.8	0.57	0.35	0.88	<dl	0.15	<dl	<dl	0.26	0.07	0.78	2.5	12
176Cp-3	0.12	2.0	7.9	2.0	<dl	2.4	0.08	0.14	1.3	99	<dl	0.72	0.16	2.0	0.56	0.22	0.84	<dl	<dl	<dl	<dl	0.21	0.01	0.59	1.5	1.0
176Cp-4	0.92	2.3	72	2.6	1.1	9.4	0.04	0.11	1.3	99	0.07	5.8	0.00	2.0	0.55	0.19	1.5	<dl	<dl	<dl	0.12	0.26	0.06	1.0	18	10
176Cp-5	0.14	3.8	1.9	1.9	<dl	3.5	0.11	0.16	1.3	138	<dl	14	0.37	1.7	0.45	0.20		<dl	<dl	<dl	0.12	0.26	0.04	2.1	5.9	36
176Cp-6	0.11	2.1	0.93	1.6	0.67	5.1	0.08	0.15	1.2	90	0.20	1.5	0.64	1.8	0.59	0.23	1.5	<dl	<dl	<dl	<dl	0.28	0.05	0.83	0.44	3.1

Mean	0.47	2.5	20	3.1	1.1	11	0.11	0.16	1.3	114	0.10	4.6	0.42	1.8	0.53	0.23	1.1	0.84	0.05	0.01	0.05	0.25	0.04	1.0	4.8	11
SD	0.53	0.68	30	2.6	1.7	16	0.10	0.04	0.06	20	0.13	4.8	0.29	0.14	0.06	0.07	0.31	2.1	0.08	0.03	0.06	0.03	0.02	0.57	6.7	13
Max.	1.3	3.8	72	8.4	4.4	44	0.31	0.24	1.4	138	0.31	14	0.71	2.0	0.59	0.35	1.5	5.0	0.17	0.07	0.12	0.28	0.07	2.1	18	36
Min.	0.11	2.0	0.93	1.6	<dl	2.4	0.04	0.11	1.2	90	<dl	0.72	<dl	1.7	0.45	0.16	0.84	<dl	<dl	<dl	<dl	0.21	0.01	0.55	<dl	1.0

Note: <dl, below minimum limit of detection