APPENDIX DR1: METHODS

Electron Microprobe Analysis

Major element compositions of the fluid inclusions were determined by electron microprobe analysis (EPMA) at the Dept. of Earth and Ocean Sciences at the University of British Columbia, using a Cameca SX100 with an accelerating voltage of 15 kV and 20 mA current. Analyzed fluid inclusions were unexposed and intact, lying just below a polished and acid-cleaned surface. Approximately 80 micro-inclusions were analyzed for each the 3 fibrous diamond coat samples, W1, W7, and W9. Analyses with oxide totals below 1% begin to show spurious compositions. Thus, measurements with totals below 1% were rejected in diamonds W7 and W9. The cutoff was raised to 4% in sample W1 to improve data quality, which was allowed by its higher average totals. The average total oxides of all accepted analyses was 4.7%. Although the sub-micron size and high volatile content of the fluid inclusions gives low totals, the accuracy is better than 15% for the major elements present (Schrauder and Navon, 1994; Izraeli et al., 2004; Weiss et al., 2008). Each analysis was renormalized to 100% on a carbon, water and carbonate-free basis. This technique is widely used for determining fluid inclusion composition in fibrous diamond (e.g. Schrauder and Navon, 1994; Izraeli et al., 2001; Izraeli et al., 2004; Klein-BenDavid et al., 2004; Tomlinson et al., 2006; Zedgenizov et al., 2006; Klein-BenDavid et al., 2007; Klein-BenDavid et al., 2009; Zedgenizov et al., 2009; Kopylova et al., 2010).

Infrared Spectroscopy

Fourier transform infrared (FTIR) spectroscopy was carried out at the Dept. of Earth and Atmospheric Sciences, University of Alberta, using a Thermo Nicolet Nexus 470 FTIR spectrometer with a Continuum infrared microscope. Nitrogen was purged through the system for beam stability. Spectra were collected through 650–4000 cm^{-1} with 200 scans at a resolution of 4 cm^{-1}. The focused beam footprint is approximately 100 μm across, but imperfections can scatter the beam within the diamond and make the analyzed region more diffuse.

Each spectrum was given an appropriate baseline and normalized for sample thickness using a reference type II diamond spectrum. Spectra were processed using a deconvolution spreadsheet from D. Fisher (Diamond Trading Company) to fit A and B centre components. The detection limit is approximately 5–10 ppm and concentrations typically have an error of 5–10%.

Trace Element and Sr Isotope Analysis

Trace elements and Sr isotope characteristics were determined in all 6 diamonds, closely following the methodology described by McNeill et al. (2009) and Klein-BenDavid et al. (2010). The technique employs off-line laser ablation to accumulate a sample within a sealed vessel. Samples were collected and analyzed at the Dept. of Earth Sciences, Durham University.

Sample Collection

Diamonds were ultrasonically cleaned in a 1:1 mix of 29 molar (M) ultra-purity (UPA, triple distilled) HF and 16 M UPA HNO_3, followed by ultrasonic cleaning in 6 M UPA HCl, and a rinse in Milli-Q water. Samples were collected from each diamond by off-line laser ablation in a sealed PTFE cell with a laser window, using a UP-213 New Wave Nd:YAG 213 nm laser. Diamonds were ablated for 3 hours in a rectangular raster pattern, liberating about 500 µg of material. One sample was taken from each diamond, except for the largest Wawa diamond (W1), from which one sample was collected from the outermost half of the coat and a second sample (A2) was collected from the inner half. Diamonds were weighed before and after ablation, so that element concentrations could be normalized to the mass of diamond ablated, to give bulk concentrations in each diamond.

Sample Chemistry

Ablated material was taken into solution by leaching the diamond and ablation cell with 29 M UPA HF and 16 M UPA HNO_3 at 120 °C for 24 hours and 1 hour of ultrasonic agitation, augmented by a second leach with 6 M UPA HCl for 120 °C for 24 hours. The leachate was dried down, then dissolved into up in 10 µl of 16 M UPA HNO_3 and diluted to 0.5 M (3%) with UPA water for sample chemistry.

All samples were divided into two aliquots, taking 20% by weight for trace element analysis, with the remainder for isotopic analysis. Aliquots for isotopic analysis were dried and taken up in 3 N UPA HNO_3. Sr was isolated into a separate fraction using Sr-spec resin (Charlier et al., 2006; Harlou et al., 2009).

Blanks

Three total-procedural blanks (TPB) were prepared in the same manner as samples, post laser ablation, to gauge trace element contributions of all acids and materials used. One of three blanks (TPB3) had higher than expected concentrations compared to the other two (TPB1 and TPB2) (supplementary Table 1). These blanks were then compared to a larger dataset of 28 TPB's for the same methodology, generated in the same lab, in the same 9 month period of as the Wawa fibrous diamond analyses, using the same reagents or manufacturer of reagents. Including additional blanks determined in the same laboratory using the same reagents allowed more meaningful statistics to be calculated. Analysis of this dataset using Chauvene's criterion or a Grubbs test flag TPB3 as an outlier, while TPB1 and TPB2 are consistent with the main population of blanks. There is a clear case for using additional blanks to provide an adequate database for properly estimating the limits of detection and quantification. Robust statistical methods (Huber's H15 method)(see Jeng, 2010) incorporate all blanks, with appropriate weighting for outliers, as suggested by Thompson & Lowthian (2011). Using the combined set of 31 TPB's, H15 means and standard deviations were calculated to define the limit of detection (LOD = mean TPB + 3σ) and limit of quantification (LOQ = mean TPB + 10σ) (supplementary Table 1).

Trace Element Mass Spectroscopy

Trace element aliquots were brought up to a volume of 250 µl and spiked with In to a concentration of 0.1 ppb. Trace element concentrations were determined with a Thermo Scientific Finnigan Element2 ICPMS, measuring the isotopes ^{49}Ti, ^{85}Rb, ^{88}Sr, ^{89}Y, ^{90}Zr, ^{93}Nb,

^{137}Ba, ^{139}La, ^{140}Ce, ^{141}Pr, ^{143}Nd, ^{147}Sm, ^{151}Eu, ^{157}Gd, ^{159}Tb, ^{161}Dy, ^{166}Er, ^{172}Yb, ^{175}Lu, ^{179}Hf, ^{208}Pb, ^{232}Th, and ^{238}U. Each analysis scanned through the range of isotopes 4 times, for a total analysis time of 110 s per sample. Variably dilute solutions of standards AGV-1, BHVO-1, and W-2 were used to calibrate sample concentrations.

Sr Isotope Mass Spectroscopy

Sr aliquots were dried down, carefully taken up in 1 µl of 16 M UPA HNO_3 and loaded on Rh filaments with TaF_5 activator (Charlier et al., 2006; Font et al., 2007). Sr isotopes were measured using a Thermo Scientific Triton TIMS. Two 0.5 ng and two 1.0 ng NBS987 standards were run along with the samples.

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Table DR1. Wawa fibrous diamond data (compiled 04/2012)

		Samples								Total Procedural Blanks			calculated from Std Deviation of TPB 1, 2, &3		Robust LOD and LOQ from larger set of 31 TPB's	
Trace Elements		W1 (outer ha	W1 (A2) (in	W7	W9	W14	W29	W50	>LOD	TPB1	TPB2	*TPB3*	LOD	LOQ	LOD	LOQ
Mass (ng) in 250µl aliquot		**M136-2**	**M136-15**	**M136-1**	**M136-3**	**M1346-4**	**M136-5**	**M136-6**	>LOQ	**M136-12**	**M136-13**	***M136-14***	3σ	10σ	3σ	10σ
element	mass analyzed											*"bad blank"*				
Ti	47	5.72E-04	6.73E-05	1.33E-03	1.62E-04	1.61E-04	5.55E-04	7.42E-04		0.00278	0.00041	0.00299	4.31E-03	1.44E-02	6.69E-02	1.98E-01
Ti	48	8.22E-04	9.99E-05	1.77E-03	2.07E-04	2.95E-04	7.34E-04	9.81E-04		0.00358	0.00053	0.00388	5.56E-03	1.85E-02	5.56E-03	1.85E-02
Ti	49	6.15E-04	8.11E-05	1.36E-03	1.71E-04	1.97E-04	5.73E-04	7.64E-04		0.00280	0.00042	0.00303	4.34E-03	1.45E-02	4.34E-03	1.45E-02
Rb	85	4.44E-02	4.94E-02	2.84E-02	2.19E-02	9.49E-03	1.06E-02	2.72E-03		0.00052	0.00111	0.00716	1.10E-02	3.67E-02	5.29E-04	1.54E-03
Sr	88	7.69E-01	7.41E-01	4.69E-01	3.93E-01	2.91E-01	5.31E-01	3.54E-02		0.00177	0.00709	0.01201	1.54E-02	5.12E-02	1.42E-02	4.11E-02
Y	89	2.14E-03	3.09E-03	8.85E-05	-2.99E-05	1.40E-03	-1.31E-04	-7.10E-05		0.00092	-0.00016	0.00199	3.23E-03	1.08E-02	1.27E-03	4.01E-03
Zr	90	1.34E-01	2.81E-02	4.75E-02	4.67E-02	2.45E-02	2.75E-02	9.35E-02		0.29267	0.04416	0.70557	1.00E+00	3.34E+00	6.09E-03	1.71E-02
Nb	93	1.90E-02	1.88E-02	1.04E-02	5.93E-03	1.65E-03	1.10E-03	4.85E-03		0.02480	0.00285	0.04858	6.86E-02	2.29E-01	6.33E-04	1.76E-03
Cs	133	2.56E-03	2.65E-03	2.01E-03	1.38E-03	4.71E-04	4.77E-04	2.34E-04		0.00003	0.00003	0.00031	4.89E-04	1.63E-03	2.44E-05	7.09E-05
Ba	137	1.92E+01	1.66E+01	1.71E+01	1.06E+01	4.32E-01	1.91E+00	8.80E-02		0.04121	0.32829	0.02587	5.11E-01	1.70E+00	1.90E-01	6.04E-01
La	139	2.41E-01	2.13E-01	7.45E-02	1.27E-01	6.97E-03	1.66E-02	1.03E-03		0.00063	0.00245	0.00344	4.27E-03	1.42E-02	8.51E-04	2.46E-03
Ce	140	1.98E-01	1.47E-01	7.21E-02	8.96E-02	1.36E-02	4.08E-02	3.14E-03		0.00394	0.00366	0.01075	1.20E-02	4.01E-02	5.32E-03	1.52E-02
Pr	141	9.11E-03	6.58E-03	3.76E-03	3.18E-03	1.32E-03	4.24E-03	2.23E-04		0.00006	0.00008	0.00051	7.56E-04	2.52E-03	4.93E-05	1.43E-04
Nd	143	1.80E-02	1.56E-02	8.45E-03	1.15E-02	5.02E-03	1.63E-02	5.50E-04		0.00035	0.00015	0.00162	2.41E-03	8.02E-03	1.64E-04	4.83E-04
Nd	145	1.66E-02	1.58E-02	8.71E-03	1.18E-02	4.83E-03	1.58E-02	6.99E-04		0.00029	0.00004	0.00180	2.85E-03	9.49E-03	2.85E-03	9.49E-03
Nd	146	1.84E-02	1.56E-02	8.53E-03	1.19E-02	4.88E-03	1.64E-02	5.74E-04		0.00030	0.00020	0.00192	2.90E-03	9.68E-03	2.90E-03	9.68E-03
Sm	147	9.78E-04	8.66E-04	5.24E-04	4.22E-04	5.87E-04	1.24E-03	-7.61E-05		0.00001	-0.00003	0.00019	3.46E-04	1.15E-03	4.85E-05	1.45E-04
Sm	149	1.03E-03	7.14E-04	5.23E-04	4.37E-04	5.39E-04	1.19E-03	2.03E-05		0.00005	0.00000	0.00031	4.99E-04	1.66E-03	4.99E-04	1.66E-03
Eu	151	3.07E-03	2.63E-03	2.86E-03	1.57E-03	2.16E-04	4.98E-04	5.10E-05		0.00002	0.00005	0.00005	5.88E-05	1.96E-04	1.83E-04	5.12E-04
Gd	157	1.68E-03	1.28E-03	7.34E-04	5.24E-04	4.87E-04	8.77E-04	-8.09E-06		0.00003	-0.00002	0.00019	3.20E-04	1.07E-03	1.23E-04	3.49E-04
Dy	161	4.76E-04	5.68E-04	6.40E-05	1.45E-04	3.25E-04	1.10E-04	-1.70E-05		0.00010	-0.00001	0.00024	3.87E-04	1.29E-03	1.58E-04	4.91E-04
Er	166	2.21E-04	3.48E-04	-5.36E-07	-1.53E-05	1.34E-04	2.14E-05	-1.76E-05		0.00011	-0.00002	0.00020	3.30E-04	1.10E-03	2.49E-05	7.36E-05
Yb	172	1.54E-04	2.29E-04	-1.51E-05	-3.06E-05	1.52E-04	-3.63E-05	2.02E-05		0.00017	-0.00001	0.00027	4.23E-04	1.41E-03	6.51E-05	1.88E-04
Lu	175	4.03E-05	3.26E-05	6.32E-07	-5.04E-06	2.82E-05	-6.83E-06	-3.24E-08		0.00005	0.00000	0.00005	7.97E-05	2.66E-04	8.20E-05	2.43E-04
Hf	179	2.81E-03	6.10E-04	1.07E-03	8.85E-04	5.55E-04	6.85E-04	2.12E-03		0.00648	0.00097	0.01506	2.13E-02	7.10E-02	2.77E-04	7.66E-04
Pb	208	1.04E-01	9.19E-02	9.08E-02	6.39E-02	1.52E-01	6.93E-03	6.68E-03		0.00613	0.01007	0.03017	3.87E-02	1.29E-01	6.96E-03	2.03E-02
Th	232	2.02E-01	1.16E-01	5.08E-02	7.12E-02	1.63E-03	1.60E-03	5.99E-04		0.00061	0.00378	0.00330	5.13E-03	1.71E-02	3.30E-04	9.45E-04
U	238	4.57E-03	1.89E-03	1.12E-03	2.87E-03	3.68E-03	4.31E-04	2.24E-04		0.00071	0.00018	0.00077	9.78E-04	3.26E-03	6.76E-05	1.96E-04
Tb	159	8.04E-05	1.07E-04	1.27E-05	2.67E-05	6.02E-05	3.94E-05	-1.04E-05		0.00001	0.00000	0.00004	7.60E-05	2.53E-04	1.79E-05	5.22E-05

Trace element aliquot size (mass fraction of ablated sample)	0.2005	0.2021	0.1997	0.2008	0.2038	0.1976	0.2018	0.5025	0.5015	0.5010
Ablated mass of diamond (mg)	0.4768	0.5430	0.5551	0.5613	0.5742	0.5188	0.5256	n/a	n/a	n/a

Larger set of Total Procedural Blanks, all generated in the same 9 month period as Wawa fibrous diamond analyses, using the same reagents or manufacturer of reagents

	TPB4	TPB5	TPB6	TPB7	TPB8	TPB9	TPB10	TPB11	TPB12	TPB13	TPB14	TPB15	TPB16	TPB17	TPB18	TPB19	TPB20	TPB21	TPB22	TPB23	TPB24	TPB25	TPB26	TPB27	TPB28	TPB29	TPB30	TPB31	"Robust statistics" Hubers method of mean and standard deviation calculation: H15 mean	H15 Std Dev	Standard method for mean and standard deviation: mean	Std Dev	*Note*
																													Avg blank	σ	Avg	σ	
Ti47	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.02774	0.03056	0.03847	0.03735	0.04385	0.05050	0.05366	0.03773	0.03625	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1.06E-02	1.88E-02			
Rb85	0.00358	0.00000	0.00000	0.00014	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00030	0.00000	0.00000	0.00071	0.00013	0.00002	0.00012	0.00019	0.00012	0.00007	0.00002	0.00159	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	9.59E-05	1.44E-04			
Sr88	0.00030	0.00000	0.00424	0.00076	0.00036	0.00000	0.00011	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00795	0.00221	0.00147	0.00236	0.00172	0.00099	0.00121	0.00013	0.00052	0.00000	0.08218	0.00809	0.07480	0.06484	0.09918	2.68E-03	3.85E-03			
Y89	0.00000	0.00000	0.00013	0.00000	0.00000	0.00000	0.00000	0.00000	0.00013	0.00000	0.00000	0.00000	0.00000	0.00012	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	6.83E-163	2.22E-162	1.27E-03	4.01E-03	*Standard method used instead of H15 method*
Zr90	0.00079	0.00000	0.00135	0.00045	0.11864	0.00000	0.00258	0.00489	0.00229	0.00049	0.00071	0.00000	0.00110	0.00517	0.00180	0.00059	0.00065	0.00259	0.00154	0.00172	0.00115	0.00024	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1.36E-03	1.58E-03			
Nb93	0.00006	0.00012	0.00006	0.00004	0.00214	0.00017	0.00018	0.00028	0.00008	0.00005	0.00023	0.00005	0.00002	0.00017	0.00009	0.00007	0.00005	0.00033	0.00010	0.00008	0.00006	0.00008	0.00298	0.00099	0.00000	0.00000	0.00000	0.00000	1.52E-04	1.60E-04			
Cs133	0.00002	0.00000	0.00000	0.00007	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00002	0.00001	0.00000	0.00001	0.00001	0.00001	0.00000	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	4.53E-06	6.64E-06			
Ba137	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00596	0.00042	0.00000	0.00000	0.00293	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	7.87E-163	2.22E-162	1.90E-01	6.04E-01	*Standard method used instead of H15 method*
La139	0.00013	0.00008	0.00037	0.00008	0.00007	0.00000	0.00005	0.00000	0.00010	0.00066	0.00147	0.00002	0.00029	0.00007	0.00058	0.00056	0.00005	0.00008	0.00001	0.00001	0.00007	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1.61E-04	2.30E-04			
Ce140	0.00045	0.00050	0.00103	0.00048	0.00057	0.00003	0.00000	0.00007	0.00074	0.00328	0.00184	0.00000	0.00178	0.00016	0.00155	0.00523	0.00010	0.00067	0.00014	0.00005	0.00067	0.00011	0.00000	0.00000	0.00000	0.00442	0.00343	0.00037	1.08E-03	1.41E-03			
Pr141	0.00001	0.00000	0.00006	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00003	0.00017	0.00000	0.00003	0.00001	0.00002	0.00000	0.00001	0.00001	0.00000	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	9.12E-06	1.34E-05			
Nd143	0.00000	0.00000	0.00008	0.00014	0.00000	0.00000	0.00000	0.00000	0.00000	0.00009	0.00000	0.00000	0.00000	0.00008	0.00014	0.00003	0.00005	0.00003	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	2.71E-05	4.56E-05			
Sm147	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00008	0.00004	0.00004	0.00001	0.00007	0.00002	0.00001	0.00012	0.00002	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	7.24E-06	1.37E-05			
Eu151	0.00001	0.00000	0.00008	0.00009	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00005	0.00011	0.00008	0.00007	0.00013	0.00012	0.00008	0.00011	0.00005	0.00009	0.00004	0.00002	0.00003	0.00000	0.00002	4.15E-05	4.71E-05			
Gd157	0.00006	0.00002	0.00010	0.00007	0.00005	0.00004	0.00006	0.00000	0.00000	0.00002	0.00017	0.00000	0.00000	0.00002	0.00001	0.00003	0.00004	0.00002	0.00000	0.00005	0.00000	0.00001	0.00000	0.00000	0.00000	0.00043	0.00000	0.00000	2.56E-05	3.24E-05			
Dy161	0.00004	0.00001	0.00004	0.00000	0.00000	0.00000	0.00000	0.00000	0.00002	0.00000	0.00005	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1.91E-162	4.97E-162	1.58E-04	4.91E-04	*Standard method used instead of H15 method*
Er166	0.00000	0.00000	0.00002	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	0.00004	0.00000	0.00000	0.00001	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00139	0.00024	0.00052	4.02E-06	6.96E-06			
Yb172	0.00001	0.00017	0.00003	0.00000	0.00002	0.00001	0.00000	0.00001	0.00001	0.00002	0.00005	0.00000	0.00003	0.00001	0.00000	0.00000	0.00001	0.00000	0.00000	0.00001	0.00000	0.00000	0.00059	0.00000	0.00000	0.00061	0.00000	0.00000	1.24E-05	1.76E-05			
Lu175	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00111	0.00130	0.00024	0.00110	0.00093	0.00104	1.31E-05	2.30E-05			
Hf179	0.00001	0.00013	0.00005	0.00002	0.00471	0.00011	0.00016	0.00033	0.00005	0.00005	0.00006	0.00003	0.00008	0.00012	0.00007	0.00002	0.00002	0.00009	0.00007	0.00006	0.00004	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	6.78E-05	6.98E-05			
Pb208	0.00143	0.00000	0.00000	0.00000	0.01151	0.00000	0.00000	0.00000	0.00000	0.00000	0.01286	0.00000	0.00000	0.00923	0.00154	0.00000	0.00000	0.00154	0.00041	0.00024	0.00000	0.00000	0.00000	0.00000	0.00000	0.00154	0.00316	0.00377	1.22E-03	1.91E-03			
Th232	0.00003	0.00001	0.00021	0.00013	0.00028	0.00002	0.00005	0.00006	0.00003	0.00010	0.00081	0.00000	0.00009	0.00001	0.00003	0.00002	0.00002	0.00002	0.00002	0.00002	0.00001	0.00001	0.00022	0.00000	0.00000	0.00000	0.00000	0.00000	6.63E-05	8.79E-05			
U238	0.00001	0.00003	0.00005	0.00002	0.00004	0.00000	0.00000	0.00000	0.00000	0.00000	0.00049	0.00000	0.00000	0.00002	0.00001	0.00000	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00020	0.00000	0.00000	1.25E-05	1.84E-05			
Tb159	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00106	0.00104	0.00072	0.00091	0.00049	0.00066	3.14E-06	4.91E-06			

Concentration (ppm) in diamond		W1	W1 (A2)	W7	W9	W14	W29	W50
element	mass analyzed							
Ti	47	3.56E-02	3.65E-03	7.12E-02	8.55E-03	8.20E-03	3.22E-02	4.16E-02
Ti	48	5.12E-02	5.42E-03	9.52E-02	1.09E-02	1.50E-02	4.26E-02	5.50E-02
Ti	49	3.83E-02	4.39E-03	7.28E-02	9.05E-03	1.00E-02	3.33E-02	4.29E-02
Rb	85	4.65E-01	4.50E-01	2.57E-01	1.94E-01	8.11E-02	1.04E-01	2.57E-02
Sr	88	8.04E+00	6.76E+00	4.23E+00	3.49E+00	2.49E+00	5.18E+00	3.33E-01
Y	89	2.23E-02	2.81E-02	7.98E-04	0.00E+00	1.20E-02	0.00E+00	0.00E+00
Zr	90	1.40E+00	2.56E-01	4.29E-01	4.14E-01	2.09E-01	2.68E-01	8.81E-01
Nb	93	1.99E-01	1.72E-01	9.38E-02	5.27E-02	1.41E-02	1.07E-02	4.57E-02
Cs	133	2.68E-02	2.41E-02	1.81E-02	1.22E-02	4.02E-03	4.66E-03	2.21E-03
Ba	137	2.01E+02	1.52E+02	1.54E+02	9.40E+01	3.69E+00	1.86E+01	8.30E-01
La	139	2.52E+00	1.94E+00	6.72E-01	1.13E+00	5.95E-02	1.62E-01	9.69E-03
Ce	140	2.07E+00	1.34E+00	6.50E-01	7.95E-01	1.16E-01	3.98E-01	2.96E-02
Pr	141	9.53E-02	6.00E-02	3.39E-02	2.82E-02	1.13E-02	4.14E-02	2.10E-03
Nd	143	1.88E-01	1.42E-01	7.62E-02	1.02E-01	4.29E-02	1.59E-01	5.19E-03
Nd	145	1.74E-01	1.44E-01	7.86E-02	1.04E-01	4.13E-02	1.54E-01	6.59E-03
Nd	146	1.92E-01	1.43E-01	7.69E-02	1.05E-01	4.17E-02	1.60E-01	5.41E-03
Sm	147	1.02E-02	7.89E-03	4.72E-03	3.75E-03	5.02E-03	1.21E-02	0.00E+00
Sm	149	1.08E-02	6.50E-03	4.72E-03	3.88E-03	4.60E-03	1.16E-02	1.91E-04
Eu	151	3.21E-02	2.39E-02	2.58E-02	1.39E-02	1.84E-03	4.86E-03	4.81E-04
Gd	157	1.76E-02	1.17E-02	6.62E-03	4.65E-03	4.16E-03	8.55E-03	0.00E+00
Dy	161	4.98E-03	5.17E-03	5.77E-04	1.28E-03	2.78E-03	1.07E-03	0.00E+00
Er	166	2.31E-03	3.17E-03	0.00E+00	0.00E+00	1.15E-03	2.09E-04	0.00E+00
Yb	172	1.61E-03	2.08E-03	0.00E+00	0.00E+00	1.30E-03	0.00E+00	1.91E-04
Lu	175	4.21E-04	2.98E-04	5.70E-06	0.00E+00	2.41E-04	0.00E+00	0.00E+00
Hf	179	2.94E-02	5.56E-03	9.67E-03	7.86E-03	4.74E-03	6.68E-03	2.00E-02
Pb	208	1.08E+00	8.37E-01	8.19E-01	5.67E-01	1.30E+00	6.76E-02	6.29E-02
Th	232	2.11E+00	1.06E+00	4.58E-01	6.32E-01	1.40E-02	1.56E-02	5.65E-03
U	238	4.78E-02	1.72E-02	1.01E-02	2.55E-02	3.15E-02	4.21E-03	2.11E-03
Tb	159	8.41E-04	9.78E-04	1.15E-04	2.37E-04	5.15E-04	3.84E-04	0.00E+00

>LOD
>LOQ
Using robust LOD and LOQ from larger set of 31 TPB's

Sr Isotopes	W1	W7	W9	W14	W29	W50
$^{87}Sr/^{86}Sr$	0.705474	0.705913	0.706280	0.706536	0.704165	0.7078408
%error on $^{87}Sr/^{86}Sr$	0.0086	0.0077	0.0075	0.0086	0.0118	0.0154
$^{87}Rb/^{86}Sr$	0.167	0.175	0.161	0.094	0.058	0.2228
%error on Rb/Sr	11	11	11	50	50	50
$^{87}Sr/^{86}Sr_i$	0.6989	0.6991	0.7000	0.7029	0.7019	0.6991
$2\sigma Sr_i$	0.0028	0.0030	0.0027	0.0072	0.0045	0.0171

Infrared spectroscopy	W1	W7	W9	W14	W29	W50
$[N]_A$ (atomic ppm)	1994	1028	1117	325	269	235
$[N]_B$ (atomic ppm) (MDL appx. 10 ppm)	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL
%B	0	0	0	0	0	0

Electron Microprobe (EPMA)(Cameca SX100, 15 kV, 20 mA)	W1	W7	W9
Average oxide mass proportions (%)			
number of fluid inclusions averaged	69	65	40
cutoff total oxide wt%	4.0	1.2	1.0
remaining average total oxide wt%	7.62	3.30	2.14
SiO2	1.57	2.38	1.99
TiO2	<MDL	<MDL	<MDL
Al2O3	0.18	0.38	0.28
Cr2O3	<MDL	<MDL	<MDL
FeO	5.35	5.45	4.86
MnO	<MDL	<MDL	<MDL
MgO	3.45	4.23	3.18
CaO	5.73	5.89	2.78
SrO	<MDL	<MDL	<MDL
BaO	15.34	13.79	16.81
Na2O	8.50	13.73	14.12
K2O	29.47	25.49	25.66
P2O5	<MDL	<MDL	<MDL
Cl	30.41	28.66	30.31
SO2	<MDL	<MDL	<MDL
renormalized total	100.000	100.000	100.000
Average molar proportions (%)			
Si	1.27	2.01	1.42
Al	0.14	0.19	0.00
Fe	3.60	3.45	3.06
Mg	4.11	4.84	3.62
Ca	4.79	4.73	2.28
Ba	4.74	3.85	5.06
Na	12.33	20.25	21.22
K	29.40	24.14	25.05
Cl	39.63	36.53	38.28
total	100.00	100.00	100.00

All above-cutoff fluid inclusion EPMA data

Sample: W1	SiO2	TiO2	Al2O3	Cr2O3	FeO	MnO	MgO	CaO	SrO	BaO	Na2O	K2O	P2O5	Cl	SO2	total oxide wt%	
point																renorm.	initial
W-55-1	0.63	<MDL	<MDL	<MDL	4.33	<MDL	1.74	3.86	<MDL	12.87	3.89	41.56	<MDL	30.68	0.45	100.00	11.16
W-58-2	0.40	0.45	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	13.23	47.79	<MDL	38.14	<MDL	100.00	10.50
W-7-1	2.73	<MDL	<MDL	<MDL	7.44	<MDL	5.58	8.38	<MDL	20.99	8.51	20.16	0.76	25.46	<MDL	100.00	9.20
W-28-4	2.05	<MDL	<MDL	<MDL	9.23	<MDL	6.50	9.41	<MDL	4.68	3.58	31.08	<MDL	33.48	<MDL	100.00	6.12
W-35-4	0.82	<MDL	<MDL	<MDL	4.49	0.49	2.25	5.43	<MDL	21.02	3.22	33.78	0.35	28.14	<MDL	100.00	13.51
W-8-4	1.99	<MDL	<MDL	<MDL	3.61	<MDL	1.72	3.53	0.69	8.55	11.06	34.06	<MDL	34.81	<MDL	100.00	14.37
W-9-2	2.36	<MDL	0.43	<MDL	6.37	0.99	3.16	5.16	1.76	13.29	6.21	28.85	<MDL	31.44	<MDL	100.00	4.87
W-9-3	2.82	<MDL	<MDL	<MDL	9.60	<MDL	3.25	5.29	<MDL	9.17	5.51	30.74	<MDL	33.61	<MDL	100.00	5.35
W1-10-1	0.88	<MDL	<MDL	<MDL	6.39	<MDL	3.42	6.52	<MDL	13.18	4.78	32.51	<MDL	32.32	<MDL	100.00	7.86

W1-11-1	2.62	<MDL	<MDL	<MDL	7.36	<MDL	4.50	6.76	<MDL	21.18	9.12	20.72	<MDL	27.74	<MDL	100.00	6.52
W1-11-2	1.76	<MDL	<MDL	<MDL	6.84	<MDL	5.46	6.99	<MDL	19.33	8.31	21.95	<MDL	29.35	<MDL	100.00	7.19
W1-13-2	1.85	<MDL	<MDL	<MDL	1.61	<MDL	3.18	3.06	<MDL	24.78	10.10	20.96	<MDL	34.46	<MDL	100.00	5.35
W1-13-3	2.12	<MDL	<MDL	<MDL	4.36	<MDL	2.08	2.96	<MDL	22.41	4.58	30.26	<MDL	31.23	<MDL	100.00	6.82
W1-14-1	1.14	<MDL	<MDL	<MDL	5.49	<MDL	3.69	6.23	1.20	5.59	6.32	36.48	<MDL	33.86	<MDL	100.00	9.43
W1-15-1	1.59	<MDL	0.69	<MDL	3.53	<MDL	2.19	3.77	<MDL	11.99	7.30	37.21	<MDL	31.74	<MDL	100.00	4.10
W1-16-1	1.05	<MDL	<MDL	<MDL	6.42	<MDL	3.10	5.94	<MDL	12.77	6.49	37.49	<MDL	26.74	<MDL	100.00	5.98
W1-17-4	3.11	<MDL	0.34	<MDL	5.55	<MDL	2.84	5.20	<MDL	19.24	6.72	28.85	0.42	27.17	0.57	100.00	6.11
W1-15-3	2.24	<MDL	0.94	0.46	4.47	<MDL	2.71	4.75	1.45	21.41	8.19	26.01	<MDL	26.90	0.46	100.00	5.43
W1-18-1	1.65	<MDL	0.19	<MDL	4.94	<MDL	2.89	5.52	<MDL	16.88	5.91	32.81	<MDL	28.95	0.26	100.00	16.11
W1-19-1	0.91	0.59	<MDL	<MDL	3.88	<MDL	2.21	3.26	<MDL	10.79	12.22	32.14	0.23	33.77	<MDL	100.00	8.92
W1-20-1	1.53	<MDL	<MDL	<MDL	7.02	<MDL	2.82	5.27	<MDL	9.52	7.91	31.85	<MDL	33.61	0.47	100.00	5.14
W1-20-2	1.37	<MDL	<MDL	<MDL	6.02	<MDL	3.43	6.35	<MDL	12.25	8.01	33.27	<MDL	28.46	0.84	100.00	5.62
W1-21-1	1.56	<MDL	<MDL	<MDL	4.29	<MDL	1.97	2.43	<MDL	20.73	10.49	25.59	0.52	32.42	<MDL	100.00	5.18
W1-21-2	1.29	<MDL	0.33	<MDL	4.34	<MDL	2.75	3.93	<MDL	15.54	11.04	27.56	<MDL	32.78	0.44	100.00	5.12
W1-21-3	0.31	<MDL	0.48	<MDL	6.62	0.83	3.61	5.02	<MDL	12.51	9.04	30.32	<MDL	30.62	0.64	100.00	5.58
W1-22-1	1.60	0.51	<MDL	<MDL	4.28	<MDL	2.39	4.30	<MDL	15.70	9.54	29.12	<MDL	31.99	0.57	100.00	5.97
W1-23-1	1.30	0.37	<MDL	0.29	7.40	0.45	4.38	8.42	<MDL	12.33	7.03	29.43	<MDL	28.38	0.20	100.00	9.29
W1-24-1	1.52	<MDL	0.37	<MDL	5.46	<MDL	2.95	4.99	<MDL	16.75	4.17	36.16	<MDL	27.63	<MDL	100.00	4.37
W1-24-3	2.27	<MDL	0.43	<MDL	5.01	<MDL	2.50	4.46	<MDL	16.63	3.78	35.46	<MDL	28.72	0.74	100.00	4.11
W1-25-1	1.71	0.40	0.14	<MDL	7.86	<MDL	3.36	5.89	<MDL	9.53	9.61	26.30	0.21	34.54	0.46	100.00	9.75
W1-26-2	1.86	<MDL	<MDL	<MDL	6.07	<MDL	4.25	6.04	<MDL	17.09	10.40	27.19	<MDL	27.10	<MDL	100.00	5.24
W1-29-3	2.82	<MDL	0.27	<MDL	6.58	<MDL	4.88	6.01	<MDL	15.53	7.79	28.42	0.55	27.15	<MDL	100.00	4.67
W1-30-1	2.19	<MDL	<MDL	<MDL	5.52	<MDL	3.27	4.74	<MDL	19.19	6.47	27.99	<MDL	29.68	0.97	100.00	4.51
W1-30-2	1.56	1.11	<MDL	<MDL	6.27	0.52	4.33	5.75	<MDL	17.11	7.85	28.21	<MDL	27.29	<MDL	100.00	5.93
W1-31-1	2.34	<MDL	<MDL	<MDL	6.89	<MDL	5.24	6.53	<MDL	19.44	10.14	22.41	<MDL	27.01	<MDL	100.00	7.99
W1-32-1	1.30	<MDL	0.32	<MDL	2.41	<MDL	2.75	4.06	<MDL	25.49	8.85	27.12	<MDL	27.70	<MDL	100.00	4.66
W1-33-1	1.52	<MDL	<MDL	<MDL	5.04	<MDL	4.33	7.44	<MDL	17.89	11.38	20.77	<MDL	31.17	0.45	100.00	7.23
W1-34-2	1.45	<MDL	<MDL	<MDL	4.88	<MDL	2.37	6.04	<MDL	13.93	9.62	32.31	<MDL	29.40	<MDL	100.00	4.33
W1-38-1	0.93	<MDL	<MDL	<MDL	3.79	<MDL	1.36	3.50	<MDL	6.15	8.28	41.53	<MDL	33.89	0.57	100.00	4.81
W1-38-2	1.36	<MDL	0.16	<MDL	6.38	<MDL	2.34	4.74	1.06	7.63	10.41	32.35	<MDL	33.36	0.20	100.00	9.20
W1-39-1	1.38	<MDL	0.35	<MDL	4.40	<MDL	2.50	4.22	2.49	11.63	12.03	29.13	0.44	31.44	<MDL	100.00	8.60
W1-40-1	3.40	<MDL	0.35	<MDL	7.27	<MDL	4.14	6.66	<MDL	25.00	6.23	22.85	<MDL	24.11	<MDL	100.00	5.97
W1-41-1	1.41	<MDL	<MDL	<MDL	5.99	<MDL	3.33	5.76	<MDL	16.71	9.12	28.31	0.38	28.99	<MDL	100.00	6.29
W1-42-1	0.72	<MDL	<MDL	0.28	3.74	0.30	1.46	3.62	0.58	9.67	7.00	38.30	<MDL	34.12	0.20	100.00	14.39
W1-43-1	1.23	<MDL	<MDL	<MDL	11.51	<MDL	5.26	9.24	<MDL	6.99	8.04	28.45	0.78	27.78	0.72	100.00	4.24
W1-43-2	1.98	<MDL	0.25	<MDL	2.55	<MDL	1.99	3.62	<MDL	21.71	8.35	29.49	<MDL	30.07	<MDL	100.00	5.05
W1-45-1	1.11	<MDL	0.23	0.40	4.46	<MDL	2.33	4.47	<MDL	19.84	6.37	25.65	<MDL	34.52	0.61	100.00	7.06
W1-46-1	0.36	0.48	0.18	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	19.72	38.04	<MDL	41.22	<MDL	100.00	11.48
W1-48-1	1.66	<MDL	0.23	<MDL	5.46	<MDL	4.19	7.70	<MDL	23.52	7.30	22.53	<MDL	27.23	0.17	100.00	14.52
W1-A-1-1	2.12	1.19	0.64	<MDL	13.07	<MDL	10.56	10.16	<MDL	15.97	14.31	21.08	<MDL	10.91	<MDL	100.00	4.92
W1-A-2-1	1.82	<MDL	0.25	<MDL	7.79	<MDL	7.55	9.81	<MDL	17.58	11.01	21.05	0.85	21.75	0.55	100.00	6.50
W1-A-3-1	2.21	<MDL	<MDL	<MDL	6.54	<MDL	5.15	6.07	<MDL	9.76	8.73	31.45	<MDL	30.10	<MDL	100.00	5.40
W1-A-5-1	0.79	<MDL	<MDL	<MDL	2.62	<MDL	2.75	4.53	<MDL	15.45	3.49	40.88	0.35	28.62	0.51	100.00	6.22
W1-A-6-1	2.69	<MDL	0.36	<MDL	4.61	<MDL	4.05	5.06	0.76	18.37	15.34	17.79	0.22	30.43	0.32	100.00	13.50
W1-A-8-1	1.36	<MDL	0.24	<MDL	5.43	<MDL	4.68	8.24	<MDL	26.02	7.35	20.53	0.24	25.91	<MDL	100.00	14.56
W1-A-9-1	2.06	<MDL	<MDL	<MDL	7.96	0.65	5.05	7.80	<MDL	8.29	7.59	30.69	0.44	29.49	<MDL	100.00	5.79
W1-A-10-1	0.65	<MDL	<MDL	<MDL	3.78	<MDL	3.48	7.88	<MDL	19.07	6.17	28.90	<MDL	30.07	<MDL	100.00	4.04
W1-A-11-1	1.36	0.68	0.26	<MDL	4.89	<MDL	2.89	6.03	<MDL	7.47	4.98	37.79	<MDL	33.65	<MDL	100.00	4.81
W1-A-11-2	0.94	<MDL	<MDL	<MDL	4.14	<MDL	3.11	7.02	<MDL	11.88	6.82	35.29	0.39	29.41	1.01	100.00	6.73
W1-A-12-1	1.77	<MDL	0.25	<MDL	5.98	<MDL	4.24	7.58	<MDL	16.25	7.51	28.09	<MDL	28.32	<MDL	100.00	4.92
W1-A-12-1	0.48	0.39	<MDL	<MDL	3.26	<MDL	1.39	4.10	<MDL	14.03	8.17	34.60	0.35	32.72	0.50	100.00	9.02
W1-A-13-1	3.11	<MDL	0.61	<MDL	7.73	<MDL	5.52	5.42	<MDL	13.67	10.11	27.61	0.39	25.51	0.33	100.00	7.61
W1-A-15-1	1.00	<MDL	0.16	<MDL	7.06	<MDL	3.72	7.47	0.88	21.20	5.08	27.93	0.33	25.17	<MDL	100.00	11.77
W1-A-16-1	1.06	<MDL	0.22	<MDL	2.53	<MDL	3.48	2.91	1.48	19.67	4.61	27.12	0.49	36.43	<MDL	100.00	5.36
W1-A-17-1	1.23	0.37	<MDL	<MDL	5.36	<MDL	3.14	11.08	1.31	21.75	8.33	18.81	<MDL	28.01	0.62	100.00	10.87
W1-A-19-1	1.26	<MDL	0.11	<MDL	6.77	0.36	4.74	6.86	<MDL	19.76	6.88	25.99	0.57	26.49	0.21	100.00	12.37
W1-A-20-1	0.67	0.67	<MDL	<MDL	6.14	0.52	3.49	6.79	<MDL	6.20	5.56	37.58	0.25	32.12	<MDL	100.00	9.43
W1-A-21-1	1.33	<MDL	0.16	<MDL	5.49	0.52	5.53	10.33	1.08	10.41	10.64	18.22	0.67	35.45	0.17	100.00	10.66
W1-A-22-2	2.64	<MDL	0.26	0.25	1.88	<MDL	2.72	1.55	1.15	25.23	10.45	27.71	0.31	25.84	<MDL	100.00	10.26

Sample: W7	SiO2	TiO2	Al2O3	Cr2O3	FeO	MnO	MgO	CaO	SrO	BaO	Na2O	K2O	P2O5	Cl	SO2	total oxide wt%	
point																renorm.	initial
W7-60	2.45	<MDL	<MDL	<MDL	5.93	<MDL	3.24	5.40	<MDL	10.38	13.59	24.47	<MDL	34.54	<MDL	100.00	8.22
W7-84	2.11	<MDL	<MDL	<MDL	4.38	<MDL	3.39	4.85	<MDL	12.42	13.81	23.67	<MDL	35.37	<MDL	100.00	6.99
W7-70	1.32	<MDL	<MDL	<MDL	2.66	<MDL	2.47	6.41	<MDL	14.86	10.47	32.15	<MDL	29.65	<MDL	100.00	6.72
W7-75	1.76	<MDL	<MDL	<MDL	4.57	<MDL	3.24	5.26	<MDL	14.73	14.26	25.37	0.80	30.02	<MDL	100.00	6.47
W7-68	3.07	<MDL	0.57	<MDL	9.17	<MDL	6.32	9.63	<MDL	17.26	11.42	18.26	0.77	23.53	<MDL	100.00	6.30
W7-63	2.47	<MDL	0.41	<MDL	6.06	<MDL	5.83	7.40	<MDL	13.95	16.67	32.29	<MDL	14.91	<MDL	100.00	6.23
W7-55	2.58	<MDL	0.54	<MDL	6.53	<MDL	4.83	6.10	<MDL	13.92	12.61	24.96	<MDL	27.93	<MDL	100.00	6.11
W7-13	0.50	<MDL	<MDL	<MDL	1.24	<MDL	1.36	2.90	<MDL	15.89	8.35	35.62	<MDL	34.14	<MDL	100.00	5.60
W7-73	0.61	<MDL	<MDL	<MDL	3.27	<MDL	<MDL	1.42	<MDL	15.59	21.46	15.81	<MDL	41.83	<MDL	100.00	5.29
W7-51	2.05	<MDL	<MDL	<MDL	5.35	<MDL	3.69	6.86	<MDL	14.06	14.13	24.52	0.92	28.43	<MDL	100.00	5.18
W7-12	1.60	<MDL	<MDL	<MDL	5.98	<MDL	4.18	5.62	<MDL	9.97	16.57	23.86	<MDL	32.22	<MDL	100.00	5.17
W7-48	2.23	<MDL	<MDL	<MDL	8.47	<MDL	6.85	8.30	<MDL	14.06	9.31	27.21	<MDL	23.56	<MDL	100.00	4.90
W7-63b	3.00	<MDL	0.58	<MDL	8.88	<MDL	7.04	8.99	<MDL	14.77	17.64	28.95	<MDL	10.15	<MDL	100.00	4.83
W7-67	1.81	<MDL	<MDL	<MDL	5.19	<MDL	3.77	3.82	<MDL	17.88	11.44	22.09	1.14	32.85	<MDL	100.00	4.73
W7-4	1.88	<MDL	0.50	<MDL	5.10	<MDL	3.75	6.98	<MDL	13.95	11.62	27.51	<MDL	28.72	<MDL	100.00	4.56
W7-57	1.25	<MDL	<MDL	<MDL	5.86	<MDL	3.61	6.31	<MDL	18.26	10.08	26.67	<MDL	27.96	<MDL	100.00	4.47
W7-7	2.10	<MDL	<MDL	<MDL	6.30	<MDL	3.59	6.64	<MDL	16.18	14.46	23.62	<MDL	27.11	<MDL	100.00	4.39
W7-14	2.49	<MDL	<MDL	<MDL	8.42	<MDL	4.29	7.31	<MDL	15.96	7.97	27.22	<MDL	26.35	<MDL	100.00	4.10
W7-1	2.47	<MDL	<MDL	<MDL	8.26	<MDL	6.46	7.62	<MDL	15.87	21.69	30.21	<MDL	7.43	<MDL	100.00	3.91
W7-58	2.12	1.18	0.56	<MDL	6.91	<MDL	4.47	6.64	<MDL	10.10	12.28	26.89	<MDL	28.83	<MDL	100.00	3.85
W7-76	1.61	<MDL	<MDL	<MDL	4.04	<MDL	3.07	5.23	<MDL	14.26	6.98	35.02	<MDL	29.78	<MDL	100.00	3.79
W7-87	2.97	<MDL	0.77	<MDL	5.63	<MDL	3.95	4.95	<MDL	11.91	9.12	27.35	<MDL	33.35	<MDL	100.00	3.76
W7-74	1.02	<MDL	<MDL	<MDL	3.16	<MDL	2.46	2.84	<MDL	<MDL	16.65	30.90	1.48	41.50	<MDL	100.00	3.76
W7-69	4.22	<MDL	0.88	<MDL	6.48	<MDL	11.58	12.79	<MDL	16.75	8.44	20.64	1.66	16.57	<MDL	100.00	3.69
W7-46	2.78	<MDL	<MDL	<MDL	4.04	<MDL	3.58	4.80	<MDL	11.40	10.37	31.67	<MDL	31.37	<MDL	100.00	3.67
W7-18	1.55	<MDL	<MDL	<MDL	4.10	<MDL	3.54	4.24	<MDL	11.13	16.84	26.26	<MDL	32.35	<MDL	100.00	3.40
W7-43	2.00	<MDL	0.99	<MDL	4.69	<MDL	4.04	6.67	<MDL	13.72	13.33	25.20	<MDL	29.36	<MDL	100.00	3.32
W7-81b	1.44	<MDL	<MDL	<MDL	<MDL	<MDL	5.67	0.82	<MDL	21.37	21.46	2.17	<MDL	47.08	<MDL	100.00	3.24
W7-72	2.99	<MDL	<MDL	<MDL	6.26	<MDL	4.59	5.74	<MDL	14.05	15.46	19.32	<MDL	31.60	<MDL	100.00	3.17
W7-49	3.00	<MDL	<MDL	<MDL	6.14	<MDL	4.09	4.90	<MDL	12.84	12.19	25.97	<MDL	30.87	<MDL	100.00	2.95
W7-10b	3.29	<MDL	<MDL	<MDL	4.55	<MDL	3.65	5.37	<MDL	13.55	13.70	25.26	<MDL	30.64	<MDL	100.00	2.93
W7-85	3.07	<MDL	<MDL	<MDL	5.60	<MDL	4.28	5.75	<MDL	12.71	12.75	26.84	<MDL	29.01	<MDL	100.00	2.84
W7-42	3.67	<MDL	<MDL	<MDL	4.90	<MDL	3.85	6.01	3.33	14.98	12.99	21.85	<MDL	28.43	<MDL	100.00	2.81
W7-79	2.77	<MDL	<MDL	<MDL	5.02	<MDL	3.91	5.68	<MDL	14.68	16.59	21.99	<MDL	29.37	<MDL	100.00	2.77
W7-25	2.90	<MDL	<MDL	<MDL	5.08	<MDL	3.13	3.49	<MDL	14.61	15.45	23.78	<MDL	31.56	<MDL	100.00	2.73
W7-19	1.55	<MDL	<MDL	<MDL	3.59	<MDL	2.46	4.31	<MDL	7.84	15.54	28.88	<MDL	35.81	<MDL	100.00	2.61
W7-59	1.48	<MDL	<MDL	<MDL	4.48	<MDL	2.62	3.73	<MDL	<MDL	19.71	33.71	<MDL	34.27	<MDL	100.00	2.48
W7-44	2.30	<MDL	<MDL	<MDL	6.33	<MDL	4.10	6.21	<MDL	6.13	14.88	27.16	<MDL	32.89	<MDL	100.00	2.48
W7-8	1.92	<MDL	0.87	<MDL	5.86	<MDL	5.02	6.93	<MDL	11.50	15.94	23.85	<MDL	28.11	<MDL	100.00	2.47
W7-45	2.76	<MDL	<MDL	<MDL	5.88	<MDL	4.55	6.81	<MDL	16.21	8.62	27.91	<MDL	27.26	<MDL	100.00	2.44
W7-52	2.23	<MDL	<MDL	<MDL	5.52	<MDL	3.98	7.07	<MDL	12.78	13.54	25.34	<MDL	29.54	<MDL	100.00	2.34
W7-9	2.03	<MDL	<MDL	<MDL	5.35	<MDL	4.19	6.27	<MDL	13.95	7.33	29.35	<MDL	31.54	<MDL	100.00	2.26
W7-18b	2.17	<MDL	<MDL	<MDL	6.23	<MDL	5.38	5.97	<MDL	19.44	19.78	32.90	<MDL	8.15	<MDL	100.00	2.24
W7-61	1.80	<MDL	<MDL	<MDL	6.56	<MDL	4.33	7.47	<MDL	12.75	13.71	24.70	<MDL	28.67	<MDL	100.00	2.19
W7-54b	3.64	<MDL	<MDL	<MDL	4.61	<MDL	6.40	7.76	<MDL	15.94	17.98	20.80	<MDL	22.87	<MDL	100.00	2.16
W7-6	3.41	<MDL	<MDL	<MDL	5.42	<MDL	3.69	5.58	<MDL	11.77	16.07	24.70	<MDL	29.36	<MDL	100.00	2.03
W7-26	2.55	<MDL	<MDL	<MDL	4.69	<MDL	3.43	4.42	<MDL	13.60	18.21	24.22	<MDL	28.88	<MDL	100.00	1.98
W7-47	1.92	<MDL	1.35	<MDL	7.11	<MDL	5.80	7.60	<MDL	13.89	10.45	23.92	<MDL	25.85	2.10	100.00	1.97
W7-32	3.15	<MDL	1.40	<MDL	6.42	<MDL	3.02	4.26	<MDL	16.36	14.57	23.49	<MDL	27.34	<MDL	100.00	1.94
W7-16	2.66	<MDL	<MDL	<MDL	7.49	<MDL	3.02	5.25	<MDL	11.52	16.30	25.88	<MDL	27.88	<MDL	100.00	1.88
W7-20	1.95	<MDL	<MDL	<MDL	4.29	<MDL	2.93	4.44	<MDL	10.08	13.65	28.12	<MDL	34.54	<MDL	100.00	1.86
W7-34	2.13	<MDL	<MDL	<MDL	7.04	<MDL	5.08	6.90	<MDL	13.63	13.85	22.89	<MDL	28.48	<MDL	100.00	1.85
W7-54	2.41	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	28.83	27.02	<MDL	<MDL	41.74	<MDL	100.00	1.82
W7-40	3.16	<MDL	<MDL	<MDL	4.67	<MDL	3.88	6.41	<MDL	<MDL	17.00	29.33	<MDL	33.34	2.21	100.00	1.82
W7-41	4.63	<MDL	<MDL	<MDL	4.99	<MDL	2.93	7.34	<MDL	15.84	9.69	25.86	<MDL	28.72	<MDL	100.00	1.68
W7-36	5.28	<MDL	<MDL	<MDL	8.09	<MDL	13.56	12.87	<MDL	11.93	7.75	20.95	3.33	16.24	<MDL	100.00	1.67
W7-38	4.66	<MDL	<MDL	<MDL	6.49	<MDL	4.75	2.45	<MDL	12.77	17.92	26.40	<MDL	24.56	<MDL	100.00	1.66
W7-30	3.24	<MDL	<MDL	<MDL	6.25	<MDL	3.49	4.74	<MDL	16.61	15.21	22.61	<MDL	27.85	<MDL	100.00	1.65
W7-5	3.40	<MDL	<MDL	<MDL	5.60	<MDL	4.45	6.56	<MDL	13.20	13.33	24.12	<MDL	29.34	<MDL	100.00	1.60
W7-33	3.89	<MDL	<MDL	<MDL	8.46	<MDL	6.05	7.33	<MDL	18.41	8.48	22.67	<MDL	24.70	<MDL	100.00	1.57
W7-5b	4.01	<MDL	<MDL	<MDL	9.76	<MDL	5.04	6.70	<MDL	<MDL	14.07	27.26	<MDL	33.16	<MDL	100.00	1.54
W7-27	3.53	<MDL	2.61	<MDL	4.79	<MDL	4.20	4.21	<MDL	13.26	19.47	22.85	<MDL	25.09	<MDL	100.00	1.33
W7-64c	7.64	<MDL	<MDL	<MDL	<MDL	<MDL	3.74	4.19	<MDL	14.21	13.51	26.72	<MDL	29.98	<MDL	100.00	1.32
W7-3b	4.62	<MDL	1.70	<MDL	6.83	<MDL	4.68	4.62	<MDL	<MDL	13.59	29.26	<MDL	34.70	<MDL	100.00	1.29
W7-3	4.92	<MDL	<MDL	<MDL	4.28	<MDL	3.94	6.30	<MDL	<MDL	12.62	30.26	<MDL	37.69	<MDL	100.00	1.23

Sample: W9	SiO2	TiO2	Al2O3	Cr2O3	FeO	MnO	MgO	CaO	SrO	BaO	Na2O	K2O	P2O5	Cl	SO2	total oxide wt%	
point																renorm.	initial
w9-97-2	0.85	<MDL	<MDL	<MDL	5.43	<MDL	2.48	3.28	<MDL	14.11	13.57	28.16	<MDL	32.11	<MDL	100.00	4.69
w9-27	1.75	<MDL	<MDL	<MDL	4.14	<MDL	3.06	3.12	<MDL	15.06	13.83	27.81	<MDL	31.24	<MDL	100.00	4.19
w9-55	1.52	<MDL	<MDL	<MDL	5.63	<MDL	3.18	3.26	<MDL	16.72	15.56	23.30	<MDL	30.83	<MDL	100.00	3.34
w9-59	1.67	<MDL	<MDL	<MDL	2.69	<MDL	3.60	1.30	<MDL	18.97	16.27	21.97	<MDL	33.54	<MDL	100.00	3.30
w9-49	2.13	<MDL	<MDL	<MDL	6.09	<MDL	3.36	3.76	<MDL	14.08	14.78	18.56	<MDL	37.23	<MDL	100.00	3.23

w9-54	1.86	<MDL	<MDL	<MDL	7.03	<MDL	2.62	2.96	<MDL	13.89	15.03	25.92	<MDL	30.68	<MDL	100.00	3.17
w9-64b	1.92	<MDL	<MDL	<MDL	5.08	<MDL	2.22	2.08	<MDL	19.60	14.61	23.68	<MDL	30.82	<MDL	100.00	3.14
w9-5	1.68	<MDL	<MDL	<MDL	4.34	<MDL	3.29	2.46	<MDL	22.56	14.62	20.85	<MDL	30.18	<MDL	100.00	2.87
w9-79	1.47	<MDL	<MDL	<MDL	2.61	<MDL	1.34	2.19	<MDL	15.92	11.18	29.31	1.61	34.37	<MDL	100.00	2.79
w9-97-1	1.36	<MDL	<MDL	<MDL	6.38	<MDL	3.97	3.31	<MDL	14.94	12.00	29.57	<MDL	28.46	<MDL	100.00	2.69
w9-76	2.02	<MDL	<MDL	<MDL	3.04	<MDL	2.23	2.96	<MDL	11.80	9.01	35.82	<MDL	33.11	<MDL	100.00	2.55
w9-50	2.84	<MDL	<MDL	<MDL	7.25	<MDL	4.69	3.49	3.51	8.94	10.15	30.64	<MDL	28.48	<MDL	100.00	2.51
w9-57	2.06	<MDL	<MDL	<MDL	6.31	<MDL	3.55	2.90	<MDL	14.83	13.78	26.86	<MDL	29.72	<MDL	100.00	2.50
w9-68	1.48	<MDL	<MDL	<MDL	3.60	<MDL	2.84	2.62	<MDL	22.00	10.89	27.51	<MDL	29.06	<MDL	100.00	2.43
w9-81	1.84	<MDL	<MDL	<MDL	8.65	<MDL	6.28	3.25	<MDL	13.32	12.35	23.59	<MDL	30.72	<MDL	100.00	2.36
w9-25	1.44	<MDL	<MDL	<MDL	3.87	<MDL	2.01	2.61	<MDL	13.38	7.25	34.59	<MDL	34.84	<MDL	100.00	2.35
w9-56	2.04	<MDL	<MDL	<MDL	3.48	<MDL	2.63	3.17	<MDL	16.40	12.43	28.43	<MDL	31.41	<MDL	100.00	2.15
w9-82	1.44	<MDL	<MDL	<MDL	2.95	<MDL	3.18	2.29	<MDL	18.68	17.47	23.72	<MDL	30.27	<MDL	100.00	2.08
w9-62	2.99	<MDL	<MDL	<MDL	6.92	<MDL	5.58	5.35	<MDL	23.70	19.91	32.58	<MDL	2.96	<MDL	100.00	1.98
w9-29	1.71	<MDL	<MDL	<MDL	5.64	<MDL	1.65	1.86	<MDL	20.11	14.28	24.55	<MDL	30.19	<MDL	100.00	1.98
w9-58	1.79	<MDL	<MDL	<MDL	3.66	<MDL	3.02	3.39	<MDL	22.02	13.78	23.54	<MDL	28.81	<MDL	100.00	1.89
w9-84	3.06	<MDL	<MDL	<MDL	5.87	<MDL	2.25	2.45	<MDL	13.00	14.41	23.93	<MDL	35.03	<MDL	100.00	1.87
w9-64	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	4.02	<MDL	<MDL	26.62	22.02	<MDL	<MDL	47.34	<MDL	100.00	1.83
w9-40	2.22	<MDL	<MDL	<MDL	4.52	<MDL	3.70	3.77	<MDL	16.33	12.72	27.00	<MDL	29.74	<MDL	100.00	1.77
w9-89	2.73	<MDL	<MDL	<MDL	6.80	<MDL	2.70	3.25	<MDL	27.25	13.54	17.67	<MDL	26.05	<MDL	100.00	1.76
w9-23	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	1.83	<MDL	<MDL	16.41	14.00	29.50	<MDL	38.26	<MDL	100.00	1.74
w9-62b	3.37	<MDL	<MDL	<MDL	9.89	<MDL	6.52	4.83	<MDL	15.11	22.76	34.22	<MDL	3.30	<MDL	100.00	1.67
w9-8	3.67	<MDL	<MDL	<MDL	3.77	<MDL	3.22	3.32	<MDL	16.81	13.57	23.82	<MDL	31.82	<MDL	100.00	1.52
w9-11	<MDL	<MDL	<MDL	<MDL	3.90	<MDL	3.23	3.09	<MDL	19.45	13.19	26.26	<MDL	30.89	<MDL	100.00	1.48
w9-14	<MDL	<MDL	<MDL	<MDL	4.05	<MDL	<MDL	4.02	<MDL	14.16	15.55	27.26	<MDL	34.96	<MDL	100.00	1.40
w9-75	2.35	<MDL	<MDL	<MDL	5.27	<MDL	3.82	2.25	<MDL	16.39	16.73	24.51	<MDL	28.69	<MDL	100.00	1.37
w9-80	<MDL	<MDL	<MDL	<MDL	5.11	<MDL	2.30	1.82	<MDL	13.25	16.73	25.84	<MDL	34.96	<MDL	100.00	1.34
w9-4	2.53	<MDL	<MDL	<MDL	5.94	<MDL	3.04	<MDL	<MDL	19.26	15.31	23.40	<MDL	30.52	<MDL	100.00	1.34
w9-30	2.62	<MDL	<MDL	<MDL	3.65	<MDL	4.09	3.48	<MDL	14.57	14.19	24.46	2.50	30.44	<MDL	100.00	1.31
w9-46	2.66	<MDL	<MDL	<MDL	4.19	<MDL	2.71	2.29	<MDL	14.23	12.40	29.98	<MDL	31.54	<MDL	100.00	1.30
w9-60	2.74	<MDL	<MDL	<MDL	<MDL	<MDL	3.33	1.70	<MDL	14.70	16.35	25.45	<MDL	35.72	<MDL	100.00	1.24
w9-67	3.47	<MDL	<MDL	<MDL	5.88	<MDL	3.44	2.50	<MDL	15.59	12.15	27.03	<MDL	29.94	<MDL	100.00	1.23
w9-39	<MDL	<MDL	<MDL	<MDL	4.12	<MDL	3.21	2.30	6.41	14.38	13.95	25.25	<MDL	30.38	<MDL	100.00	1.17
w9-22	<MDL	<MDL	<MDL	<MDL	8.97	<MDL	2.18	3.36	<MDL	16.09	10.74	27.29	<MDL	31.36	<MDL	100.00	1.14
w9-44	3.05	<MDL	<MDL	<MDL	<MDL	<MDL	3.63	2.54	<MDL	21.74	22.06	31.69	<MDL	15.30	<MDL	100.00	1.07