Analysis of sulfur in VG-2 glass

The following analyses demonstrate the effect of trace sulfur analyses using different primary standards. So long as the sulfur standard was peaked for each standard (to account for peak shift) the analysis of the VG-2 glass was essentially consistent.

The only problem observed was that the composition for the Pyrrhotite standard was entered nominally as FeS. Once the actual analysis was entered into the standard database, this standard gave consistent analyses with the other standards.

Conclusion: It doesn’t matter what standard one uses for sulfur analyses provided that the analyst is measuring the peak intensity AT THE ACTUAL PEAK POSITIONS for both the unknown and standard.

VG-2 glass S analysis (each standard peaked individually)- NOTE, this measurement is not intended to be accurate, only as a basis for understanding the change in composition as a function of peak position and standard.

Standard	S (weight percent, analyses at 15 kev, 10 sec)
Anhydrite:	**.14452**
Pyrite	**.14470**
Pyrrhotite	**.13285 (assumed 50/50)**
Pyrrhotite	**.14968 (Fe(1-x)S, where x=0.17) (from web database)**
Pyrrhotite	**.14472 (Fe(1-x)S, where x=0.13) (from EPMA analysis of actual standard)**

St 327 Set 2 Anhydrite (CaSO4) UC # 5555
TakeOff = 40 KiloVolts = 15 Beam Current = 20 Beam Size = 10
"slightly soluble in alcohol", JJD
Number of Data Lines: 5 Number of 'Good' Data Lines: 5
First/Last Date-Time: 11/11/2004 05:24:01 PM to 11/11/2004 05:35:03 PM

Average Total Oxygen:	47.047	Average Total Weight%:	100.467
Average Calculated Oxygen:	47.047	Average Atomic Number:	13.533
Average Excess Oxygen:	.000	Average Atomic Weight:	22.765
Average ZAF Iteration:	2.40	Average Quant Iterate:	4.00

Results in Elemental Weight Percents

SPEC:	O	Sr
TYPE:	CALC	SPEC
AVER:	47.0466	.49300
SDEV:	.17662	.00000

ELEM:	Ca	Si	Al	Na	K	Fe	Ti	S	P	Ni	Mn	Mg
BGDS:	MAN	MAN	MAN	MAN	LIN	MAN	MAN	LIN	LIN	LIN	LIN	MAN
ABS%:	-3.46	-15.05	-24.16	-52.20	.00	-1.55	-6.06	.00	.00	.00	.00	-36.62
TIME:	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00

ELEM:	Ca	Si	Al	Na	K	Fe	Ti	S	P	Ni	Mn	Mg	SUM
25	29.6721	.00081	.00393	.00000	.00694	.03721	.02486	23.4164	.00226	.00000	.00000	.01000	100.700
26	29.4445	.00053	.00000	.00000	.01163	.00079	.06265	23.5105	.02034	.00000	.05065	.00868	100.735
27	29.2846	.00000	.00715	.01199	.00000	.00000	.00000	23.6730	.04068	.01783	.00000	.00833	100.829
28	29.2147	.00125	.00501	.00197	.00000	.00000	.02409	23.4141	.00226	.00000	.00000	.00091	99.9872
29	29.0576	.00741	.00000	.00000	.00000	.00000	.02966	23.4902	.04746	.01019	.00000	.00000	100.083
AVER:	29.3347	.00200	.00322	.00279	.00371	.00760	.02825	23.5008	.02260	.00560	.01013	.00558	100.467
SDEV:	.23433	.00306	.00316	.00521	.00535	.01656	.02243	.10548	.02108	.00813	.02265	.00473	
SERR:	.10480	.00137	.00141	.00233	.00239	.00741	.01003	.04717	.00943	.00364	.01013	.00212	
%RSD:	.8	152.8	98.1	186.7	144.0	217.9	79.4	.4	93.3	145.2	223.6	84.8	
PUBL:	29.1270	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	23.4990	n.a.	n.a.	n.a.	n.a.	100.000
%VAR:	.71	.00	.00	.00	.00	.00	.00	.01	.00	.00	.00	.00	
DIFF:	.20770	.00000	.00000	.00000	.00000	.00000	.00000	.00184	.00000	.00000	.00000	.00000	
STDS:	358	298	374	336	374	395	22	327	285	28	25	12	
STKF:	.1693	.1849	.0701	.0735	.1132	.6779	.5547	.2205	.1599	.7502	.7341	.4736	
STCT:	2807.0	6645.5	2659.3	1728.1	1650.2	3309.5	1241.8	1625.0	778.3	3452.2	3325.8	16139.1	
UNKF:	.2694	.0000	.0000	.0000	.0000	.0001	.0002	.2205	.0002	.0000	.0001	.0000	
UNCT:	4466.3	.5	.5	-.2	-.1	-.1	.5	1625.0	1.0	-.5	-.1	1.1	
UNBG:	13.3	29.7	22.4	8.4	11.5	6.3	1.8	9.2	2.5	9.5	4.6	15.0	
ZCOR:	1.0888	1.1725	1.3609	2.1509	1.0560	1.1978	1.2326	1.0659	1.1090	1.1810	1.2226	1.5829	
KRAW:	1.5911	.0001	.0002	-.0001	-.0001	.0000	.0004	1.0000	.0013	-.0002	.0000	.0001	
PKBG:	337.05	1.02	1.02	.97	.99	.99	1.25	179.04	1.40	.96	1.00	1.08	
INT%:	.00	.00	.00	.00	.00	-.97	.00	.00	.00	.00	.00	.00	

St 730 Set 1 Pyrite UC # 21334
TakeOff = 40 KiloVolts = 15 Beam Current = 20 Beam Size = 10
Leadville, Colorado
Excellent standard for Fe and S
AA (by C. Lewis): Cu=0.005%, Au=0.00%, Ag=0.00%, Zn=0.004%
XRF (by J. Hampel): Ni=0.00%, Co=0.00%, Cu=0.01%, As=0.009%
Zn=0.0009%, Pb=0.010%, Ga=0.0001%, Cr=0.00%, Ti=0.058%
Number of Data Lines: 5 Number of 'Good' Data Lines: 5
First/Last Date-Time: 11/11/2004 05:38:02 PM to 11/11/2004 05:49:06 PM

Average Total Oxygen:	.000	Average Total Weight%:	100.869
Average Calculated Oxygen:	.000	Average Atomic Number:	20.700
Average Excess Oxygen:	.000	Average Atomic Weight:	40.089
Average ZAF Iteration:	3.00	Average Quant Iterate:	4.00

Results in Elemental Weight Percents

SPEC:	O
TYPE:	SPEC
AVER:	.00000
SDEV:	.00000

ELEM:	Ca	Si	Al	Na	K	Fe	Ti	S	P	Ni	Mn	Mg
BGDS:	MAN	MAN	MAN	MAN	LIN	MAN	MAN	LIN	LIN	LIN	LIN	MAN
ABS%:	-9.87	-23.94	-34.49	-62.14	.00	-1.14	-5.03	.00	.00	.00	.00	-47.62
TIME:	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00

ELEM:	Ca	Si	Al	Na	K	Fe	Ti	S	P	Ni	Mn	Mg	SUM
30	.00699	.00000	.00000	.01618	.01439	47.4054	.00000	53.6074	.00000	.00000	.05036	.00673	101.107
31	.00000	.00000	.00000	.00000	.00000	47.6958	.02756	53.7226	.00000	.03799	.00000	.00419	101.488
32	.00000	.00000	.00000	.00000	.00000	46.9164	.01803	53.1672	.00000	.00000	.00000	.00000	100.102
33	.00575	.00000	.00000	.00446	.00000	47.1962	.00000	53.5088	.00000	.00000	.01385	.00000	100.729
34	.00345	.00000	.00000	.00000	.01817	47.7225	.00000	53.1702	.00000	.00000	.00000	.00373	100.918
AVER:	.00324	.00000	.00000	.00413	.00651	47.3872	.00912	53.4352	.00000	.00760	.01284	.00293	100.869
SDEV:	.00322	.00000	.00000	.00701	.00902	.34135	.01293	.25484	.00000	.01699	.02181	.00291	
SERR:	.00144	.00000	.00000	.00314	.00403	.15266	.00578	.11397	.00000	.00760	.00975	.00130	
%RSD:	99.4	.1	.1	169.8	138.5	.7	141.8	.5	.1	223.6	169.9	99.3	
PUBL:	n.a.	n.a.	n.a.	n.a.	n.a.	46.5500	.05800	53.4500	n.a.	.00000	n.a.	n.a.	100.058
%VAR:	.00	.00	.00	.00	.00	1.80	-84.28	-.03	.00	.00	.00	.00	
DIFF:	.00000	.00000	.00000	.00000	.00000	.83723	-.04888	-.01477	.00000	.00000	.00000	.00000	
STDS:	358	298	374	336	374	395	22	327	285	28	25	12	
STKF:	.1693	.1849	.0701	.0735	.1132	.6779	.5547	.2205	.1599	.7502	.7341	.4736	
STCT:	2807.0	6643.3	2659.3	1728.1	1650.2	3309.5	1241.8	1625.0	778.3	3452.2	3325.8	16139.1	
UNKF:	.0000	.0000	.0000	.0000	.0001	.4358	.0001	.5057	.0000	.0001	.0001	.0000	
UNCT:	.0	-1.9	-1.4	-.1	.0	2127.4	-.2	3727.1	-.9	-.5	-.3	.0	
UNBG:	20.1	42.4	29.6	11.4	16.2	11.2	3.0	16.4	3.9	14.8	7.7	19.7	
ZCOR:	1.0623	1.2091	1.4587	2.5127	1.1374	1.0874	1.0816	1.0566	1.0952	1.1014	1.1112	1.7741	
KRAW:	.0000	-.0003	-.0005	-.0001	.0000	.6428	-.0002	2.2936	-.0011	-.0001	-.0001	.0000	

PKBG:	**1.00**	**.96**	**.95**	**.99**	**1.01**	**191.00**	**.93**	**228.26**	**.77**	**.97**	**.98**	**1.00**
INT%:	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**	**.00**

St 757 Set 1 FeS (Pyrrhotite)
TakeOff = 40 KiloVolts = 15 Beam Current = 20 Beam Size = 10
Number of Data Lines: 5 Number of 'Good' Data Lines: 5
First/Last Date-Time: 11/11/2004 05:52:05 PM to 11/11/2004 06:03:10 PM

Average Total Oxygen:	.000	Average Total Weight%:	100.241
Average Calculated Oxygen:	.000	Average Atomic Number:	22.064
Average Excess Oxygen:	.000	Average Atomic Weight:	43.201
Average ZAF Iteration:	2.20	Average Quant Iterate:	4.00

Results in Elemental Weight Percents

SPEC:	O
TYPE:	SPEC
AVER:	.00000
SDEV:	.00000

ELEM:	Ca	Si	Al	Na	K	Fe	Ti	S	P	Ni	Mn	Mg
BGDS:	MAN	MAN	MAN	MAN	LIN	MAN	MAN	LIN	LIN	LIN	LIN	MAN
ABS%:	-8.54	-28.35	-39.62	-66.87	.00	-.86	-4.23	.00	.00	.00	.00	-52.94
TIME:	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00

ELEM:	Ca	Si	Al	Na	K	Fe	Ti	S	P	Ni	Mn	Mg	SUM
35	.00000	.00000	.00000	.00000	.00000	60.0981	.01260	39.8057	.00468	.79053	.03079	.00456	100.747
36	.01076	.00000	.00000	.01006	.00000	59.5700	.00798	39.3829	.00234	.72710	.01908	.00626	99.7365
37	.00000	.00000	.00000	.00424	.00000	60.2258	.00000	39.4886	.00000	.85375	.04937	.00000	100.622
38	.00493	.00000	.00492	.00000	.00000	59.1870	.05884	39.5832	.01403	.80724	.00327	.00337	99.6668
39	.00396	.00000	.00192	.00000	.00000	59.9621	.00334	39.6697	.00468	.78788	.00000	.00000	100.434
AVER:	.00393	.00000	.00137	.00286	.00000	59.8086	.01655	39.5860	.00514	.79330	.02050	.00284	100.241
SDEV:	.00443	.00000	.00215	.00443	.00000	.42567	.02411	.16280	.00533	.04546	.02036	.00279	
SERR:	.00198	.00000	.00096	.00198	.00000	.19036	.01078	.07281	.00238	.02033	.00911	.00125	
%RSD:	112.8	.1	157.4	154.7	.0	.7	145.7	.4	103.6	5.7	99.3	98.2	
PUBL:	n.a.	n.a.	n.a.	n.a.	n.a.	59.1110	n.a.	40.8890	n.a.	n.a.	n.a.	n.a.	100.000
%VAR:	.00	.00	.00	.00	.00	1.18	.00	-3.19	.00	.00	.00	.00	
DIFF:	.00000	.00000	.00000	.00000	.00000	.69759	.00000	-1.3030	.00000	.00000	.00000	.00000	
STDS:	358	298	374	336	374	395	22	327	285	28	25	12	
STKF:	.1693	.1849	.0701	.0735	.1132	.6779	.5547	.2205	.1599	.7502	.7341	.4736	
STCT:	2807.0	6641.1	2659.3	1728.1	1650.2	3309.5	1241.8	1624.9	778.3	3452.2	3325.8	16139.1	
UNKF:	.0000	.0000	.0000	.0000	.0000	.5622	.0002	.3686	.0000	.0073	.0002	.0000	
UNCT:	.3	-4.1	-1.5	-.4	-2.7	2744.4	.3	2716.6	.2	33.6	.8	.2	
UNBG:	22.4	44.4	30.4	10.9	18.9	12.2	3.1	16.3	2.9	15.2	7.7	19.0	
ZCOR:	1.0253	1.2751	1.5660	2.8313	1.0956	1.0639	1.0402	1.0739	1.1482	1.0880	1.0873	1.9502	
KRAW:	.0001	-.0006	-.0006	-.0002	-.0016	.8293	.0002	1.6718	.0002	.0097	.0002	.0000	
PKBG:	1.01	.91	.95	.97	.86	226.24	1.09	168.98	1.05	3.21	1.11	1.01	
INT%:	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	

St 298 Set 2 Glass, VG-2 USNM 111240/52
TakeOff = 40 KiloVolts = 15 Beam Current = 20 Beam Size = 10
Juan de Fuca Basaltic Glass
Number of Data Lines: 5 Number of 'Good' Data Lines: 5
First/Last Date-Time: 11/11/2004 04:55:55 PM to 11/11/2004 05:06:58 PM

Average Total Oxygen:	43.790	Average Total Weight%:	99.343
Average Calculated Oxygen:	43.790	Average Atomic Number:	12.809
Average Excess Oxygen:	.000	Average Atomic Weight:	22.070
Average ZAF Iteration:	3.00	Average Quant Iterate:	3.00

Results in Elemental Weight Percents

SPEC:	O
TYPE:	CALC
AVER:	43.7897
SDEV:	.10341

ELEM:	Ca	Si	Al	Na	K	Fe	Ti	S	P	Ni	Mn	Mg
BGDS:	MAN	MAN	MAN	MAN	LIN	MAN	MAN	LIN	LIN	LIN	LIN	MAN
ABS%:	-3.48	-21.61	-26.61	-49.62	.00	-.29	-2.50	.00	.00	.00	.00	-35.87
TIME:	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00

ELEM:	Ca	Si	Al	Na	K	Fe	Ti	S	P	Ni	Mn	Mg	SUM
15	7.65472	23.7959	7.39518	1.98211	.16231	9.12237	.96959	.16737	.08598	.00507	.04794	3.99781	99.1249
16	7.64928	23.7442	7.39269	1.96991	.17020	8.81813	1.13551	.14267	.09453	.02029	.13018	4.00919	98.9828
17	7.67020	23.6588	7.42492	1.93467	.15238	9.02185	1.09244	.13833	.08592	.00000	.21747	4.07332	99.1742
18	7.70077	23.7526	7.39470	2.10572	.15194	9.14024	1.02480	.14393	.09455	.04818	.14112	4.10122	99.6728
19	7.77203	23.7885	7.42427	2.08671	.17793	9.05015	1.03496	.13028	.12601	.01014	.20417	4.02589	99.7580
AVER:	7.68940	23.7480	7.40635	2.01582	.16295	9.03055	1.05146	.14452	.09740	.01674	.14818	4.04149	99.3425
SDEV:	.05034	.05459	.01668	.07572	.01130	.12849	.06409	.01385	.01656	.01911	.06775	.04409	
SERR:	.02251	.02441	.00746	.03386	.00505	.05746	.02866	.00619	.00741	.00855	.03030	.01972	
%RSD:	.7	.2	.2	3.8	6.9	1.4	6.1	9.6	17.0	114.2	45.7	1.1	
PUBL:	7.94739	23.7501	7.44119	1.94365	.15773	9.20329	1.10907	.13500	.08728	n.a.	.17038	4.04631	99.7554
%VAR:	-3.25	-.01	-.47	3.71	3.31	-1.88	-5.19	7.05	11.59	.00	-13.03	-.12	
DIFF:	-.25799	-.00213	-.03484	.07217	.00522	-.17274	-.05761	.00952	.01012	.00000	-.02220	-.00482	
STDS:	358	298	374	336	374	395	22	327	285	28	25	12	
STKF:	.1693	.1849	.0701	.0735	.1132	.6779	.5547	.2205	.1599	.7502	.7341	.4736	
STCT:	2807.0	6650.6	2659.3	1728.1	1650.2	3309.5	1241.8	1625.7	778.3	3452.2	3325.8	16139.1	
UNKF:	.0713	.1848	.0532	.0100	.0015	.0766	.0090	.0012	.0007	.0001	.0012	.0261	
UNCT:	1181.8	6650.0	2017.9	233.9	21.5	373.8	20.1	8.6	3.4	.6	5.6	888.5	
UNBG:	12.7	26.6	21.3	8.5	9.8	5.9	1.6	3.3	1.7	8.2	4.4	14.3	
ZCOR:	1.0787	1.2848	1.3920	2.0257	1.1032	1.1792	1.1716	1.2418	1.4051	1.1759	1.1996	1.5501	
KRAW:	.4210	.9999	.7588	.1354	.0131	.1130	.0162	.0053	.0043	.0002	.0017	.0551	
PKBG:	93.74	250.75	95.75	28.67	3.21	64.45	13.24	3.68	3.09	1.08	2.35	63.00	
INT%:	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	

St 298 Set 2 Glass, VG-2 USNM 111240/52
TakeOff = 40 KiloVolts = 15 Beam Current = 20 Beam Size = 10
Juan de Fuca Basaltic Glass
Number of Data Lines: 5 Number of 'Good' Data Lines: 5
First/Last Date-Time: 11/11/2004 04:55:55 PM to 11/11/2004 05:06:58 PM

Average Total Oxygen:	43.790	Average Total Weight%:	99.343
Average Calculated Oxygen:	43.790	Average Atomic Number:	12.809
Average Excess Oxygen:	.000	Average Atomic Weight:	22.070
Average ZAF Iteration:	3.00	Average Quant Iterate:	3.00

Results in Elemental Weight Percents

SPEC:	O												
TYPE:	CALC												
AVER:	43.7900												
SDEV:	.10339												
ELEM:	Ca	Si	Al	Na	K	Fe	Ti	S	P	Ni	Mn	Mg	
BGDS:	MAN	MAN	MAN	MAN	LIN	MAN	MAN	LIN	LIN	LIN	LIN	MAN	
ABS%:	-3.48	-21.61	-26.61	-49.62	.00	-.29	-2.50	.00	.00	.00	.00	-35.87	
TIME:	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	
ELEM:	Ca	Si	Al	Na	K	Fe	Ti	S	P	Ni	Mn	Mg	SUM
15	7.65472	23.7958	7.39518	1.98211	.16231	9.12237	.96959	.16760	.08598	.00507	.04794	3.99781	99.1254
16	7.64928	23.7442	7.39268	1.96991	.17020	8.81813	1.13551	.14286	.09453	.02029	.13018	4.00919	98.9832
17	7.67020	23.6588	7.42491	1.93467	.15238	9.02186	1.09244	.13850	.08592	.00000	.21748	4.07332	99.1746
18	7.70077	23.7526	7.39470	2.10572	.15194	9.14024	1.02480	.14411	.09455	.04818	.14112	4.10122	99.6733
19	7.77203	23.7885	7.42427	2.08671	.17793	9.05015	1.03496	.13043	.12601	.01014	.20417	4.02589	99.7584
AVER:	7.68940	23.7480	7.40635	2.01582	.16295	9.03055	1.05146	.14470	.09740	.01674	.14818	4.04149	99.3430
SDEV:	.05034	.05459	.01668	.07572	.01130	.12849	.06409	.01387	.01656	.01911	.06775	.04409	
SERR:	.02251	.02441	.00746	.03386	.00505	.05746	.02866	.00620	.00741	.00855	.03030	.01972	
%RSD:	.7	.2	.2	3.8	6.9	1.4	6.1	9.6	17.0	114.2	45.7	1.1	
PUBL:	7.94739	23.7501	7.44119	1.94365	.15773	9.20329	1.10907	.13500	.08728	n.a.	.17038	4.04631	99.7554
%VAR:	-3.25	-.01	-.47	3.71	3.31	-1.88	-5.19	7.18	11.59	.00	-13.03	-.12	
DIFF:	-.25799	-.00214	-.03484	.07217	.00522	-.17274	-.05761	.00970	.01012	.00000	-.02220	-.00482	
STDS:	358	298	374	336	374	395	22	730	285	28	25	12	
STKF:	.1693	.1849	.0701	.0735	.1132	.6779	.5547	.5061	.1599	.7502	.7341	.4736	
STCT:	2807.0	6650.6	2659.3	1728.1	1650.2	3309.5	1241.8	3727.1	778.3	3452.2	3325.8	16139.1	
UNKF:	.0713	.1848	.0532	.0100	.0015	.0766	.0090	.0012	.0007	.0001	.0012	.0261	
UNCT:	1181.8	6650.0	2017.9	233.9	21.5	373.8	20.1	8.6	3.4	.6	5.6	888.5	
UNBG:	12.7	26.6	21.3	8.5	9.8	5.9	1.6	3.3	1.7	8.2	4.4	14.3	
ZCOR:	1.0787	1.2848	1.3920	2.0257	1.1032	1.1792	1.1716	1.2418	1.4051	1.1759	1.1996	1.5501	
KRAW:	.4210	.9999	.7588	.1354	.0131	.1130	.0162	.0023	.0043	.0002	.0017	.0551	
PKBG:	93.74	250.75	95.75	28.67	3.21	64.45	13.24	3.68	3.09	1.08	2.35	63.00	
INT%:	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	

St 298 Set 2 Glass, VG-2 USNM 111240/52
TakeOff = 40 KiloVolts = 15 Beam Current = 20 Beam Size = 10
Juan de Fuca Basaltic Glass
Number of Data Lines: 5 Number of 'Good' Data Lines: 5
First/Last Date-Time: 11/11/2004 04:55:55 PM to 11/11/2004 05:06:58 PM

Average Total Oxygen:	43.773	Average Total Weight%:	99.315
Average Calculated Oxygen:	43.773	Average Atomic Number:	12.810
Average Excess Oxygen:	.000	Average Atomic Weight:	22.071
Average ZAF Iteration:	3.00	Average Quant Iterate:	3.00

Results in Elemental Weight Percents

SPEC:	O
TYPE:	CALC
AVER:	43.7732
SDEV:	.10410

ELEM:	Ca	Si	Al	Na	K	Fe	Ti	S	P	Ni	Mn	Mg
BGDS:	MAN	MAN	MAN	MAN	LIN	MAN	MAN	LIN	LIN	LIN	LIN	MAN
ABS%:	-3.48	-21.61	-26.61	-49.62	.00	-.29	-2.50	.00	.00	.00	.00	-35.87
TIME:	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00

ELEM:	Ca	Si	Al	Na	K	Fe	Ti	S	P	Ni	Mn	Mg	SUM
15	7.65461	23.7966	7.39517	1.98201	.16231	9.12229	.97014	.15387	.08599	.00507	.04794	3.99784	99.0933
16	7.64919	23.7448	7.39265	1.96981	.17019	8.81807	1.13605	.13116	.09454	.02029	.13018	4.00922	98.9559
17	7.67011	23.6594	7.42488	1.93457	.15238	9.02179	1.09299	.12716	.08592	.00000	.21747	4.07335	99.1482
18	7.70068	23.7532	7.39468	2.10562	.15194	9.14016	1.02534	.13231	.09455	.04818	.14112	4.10125	99.6457
19	7.77194	23.7891	7.42423	2.08661	.17793	9.05008	1.03549	.11975	.12602	.01014	.20417	4.02592	99.7335
AVER:	7.68931	23.7486	7.40632	2.01572	.16295	9.03048	1.05200	.13285	.09740	.01674	.14818	4.04151	99.3153
SDEV:	.05035	.05461	.01667	.07572	.01130	.12849	.06409	.01274	.01656	.01911	.06775	.04409	
SERR:	.02252	.02442	.00746	.03386	.00505	.05746	.02866	.00570	.00741	.00855	.03030	.01972	
%RSD:	.7	.2	.2	3.8	6.9	1.4	6.1	9.6	17.0	114.2	45.7	1.1	
PUBL:	7.94739	23.7501	7.44119	1.94365	.15773	9.20329	1.10907	.13500	.08728	n.a.	.17038	4.04631	99.7554
%VAR:	-3.25	-.01	-.47	3.71	3.31	-1.88	-5.15	-1.59	11.60	.00	-13.03	-.12	
DIFF:	-.25808	-.00150	-.03487	.07207	.00522	-.17281	-.05707	-.00215	.01012	.00000	-.02220	-.00480	
STDS:	358	298	374	336	374	395	22	757	285	28	25	12	
STKF:	.1693	.1849	.0701	.0735	.1132	.6779	.5547	.3387	.1599	.7502	.7341	.4736	
STCT:	2807.0	6650.5	2659.3	1728.1	1650.2	3309.5	1241.9	2716.6	778.3	3452.2	3325.8	16139.1	
UNKF:	.0713	.1848	.0532	.0100	.0015	.0766	.0090	.0011	.0007	.0001	.0012	.0261	
UNCT:	1181.8	6649.9	2017.9	233.9	21.5	373.8	20.1	8.6	3.4	.6	5.6	888.5	
UNBG:	12.7	26.7	21.4	8.5	9.8	5.9	1.6	3.3	1.7	8.2	4.4	14.3	
ZCOR:	1.0786	1.2848	1.3920	2.0257	1.1032	1.1792	1.1716	1.2418	1.4052	1.1759	1.1996	1.5501	
KRAW:	.4210	.9999	.7588	.1353	.0131	.1130	.0162	.0032	.0043	.0002	.0017	.0551	
PKBG:	93.78	250.16	95.51	28.64	3.21	64.45	13.33	3.68	3.09	1.08	2.35	63.01	
INT%:	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	

St 298 Set 2 Glass, VG-2 USNM 111240/52
TakeOff = 40 KiloVolts = 15 Beam Current = 20 Beam Size = 10
Juan de Fuca Basaltic Glass
Number of Data Lines: 5 Number of 'Good' Data Lines: 5
First/Last Date-Time: 11/11/2004 04:55:55 PM to 11/11/2004 05:06:58 PM

Average Total Oxygen:	43.797	Average Total Weight%:	99.355
Average Calculated Oxygen:	43.797	Average Atomic Number:	12.809
Average Excess Oxygen:	.000	Average Atomic Weight:	22.070
Average ZAF Iteration:	3.00	Average Quant Iterate:	3.00

Results in Elemental Weight Percents

SPEC:	O												
TYPE:	CALC												
AVER:	43.7971												
SDEV:	.10309												
ELEM:	Ca	Si	Al	Na	K	Fe	Ti	S	P	Ni	Mn	Mg	
BGDS:	MAN	MAN	MAN	MAN	LIN	MAN	MAN	LIN	LIN	LIN	LIN	MAN	
ABS%:	-3.48	-21.61	-26.61	-49.62	.00	-.29	-2.50	.00	.00	.00	.00	-35.87	
TIME:	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	
ELEM:	Ca	Si	Al	Na	K	Fe	Ti	S	P	Ni	Mn	Mg	SUM
15	7.65478	23.7955	7.39514	1.98212	.16231	9.12240	.96960	.17337	.08598	.00507	.04794	3.99781	99.1392
16	7.64933	23.7439	7.39265	1.96991	.17020	8.81816	1.13552	.14778	.09453	.02029	.13018	4.00919	98.9950
17	7.67025	23.6585	7.42488	1.93468	.15238	9.02188	1.09245	.14327	.08592	.00000	.21748	4.07332	99.1860
18	7.70082	23.7523	7.39466	2.10572	.15194	9.14026	1.02480	.14907	.09454	.04818	.14112	4.10122	99.6851
19	7.77207	23.7882	7.42423	2.08672	.17794	9.05017	1.03496	.13492	.12601	.01014	.20417	4.02589	99.7691
AVER:	7.68945	23.7477	7.40631	2.01583	.16295	9.03058	1.05147	.14968	.09740	.01674	.14818	4.04148	99.3549
SDEV:	.05034	.05458	.01668	.07572	.01130	.12850	.06409	.01435	.01656	.01911	.06775	.04409	
SERR:	.02251	.02441	.00746	.03386	.00505	.05746	.02866	.00642	.00741	.00855	.03030	.01972	
%RSD:	.7	.2	.2	3.8	6.9	1.4	6.1	9.6	17.0	114.2	45.7	1.1	
PUBL:	7.94739	23.7501	7.44119	1.94365	.15773	9.20329	1.10907	.13500	.08728	n.a.	.17038	4.04631	99.7554
%VAR:	-3.25	-.01	-.47	3.71	3.31	-1.88	-5.19	10.88	11.59	.00	-13.03	-.12	
DIFF:	-.25794	-.00241	-.03488	.07218	.00522	-.17271	-.05761	.01468	.01011	.00000	-.02220	-.00483	
STDS:	358	298	374	336	374	395	22	757	285	28	25	12	
STKF:	.1693	.1849	.0701	.0735	.1132	.6779	.5547	.3816	.1599	.7502	.7341	.4736	
STCT:	2807.0	6650.6	2659.3	1728.1	1650.2	3309.5	1241.8	2716.6	778.3	3452.2	3325.8	16139.1	
UNKF:	.0713	.1848	.0532	.0100	.0015	.0766	.0090	.0012	.0007	.0001	.0012	.0261	
UNCT:	1181.8	6650.0	2017.9	233.9	21.5	373.8	20.1	8.6	3.4	.6	5.6	888.5	
UNBG:	12.7	26.6	21.3	8.5	9.8	5.9	1.6	3.3	1.7	8.2	4.4	14.3	
ZCOR:	1.0787	1.2848	1.3920	2.0257	1.1032	1.1792	1.1716	1.2417	1.4051	1.1759	1.1996	1.5501	
KRAW:	.4210	.9999	.7588	.1354	.0131	.1130	.0162	.0032	.0043	.0002	.0017	.0551	
PKBG:	93.74	250.75	95.75	28.67	3.21	64.45	13.24	3.68	3.09	1.08	2.35	63.00	
INT%:	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	

St 298 Set 2 Glass, VG-2 USNM 111240/52
TakeOff = 40 KiloVolts = 15 Beam Current = 20 Beam Size = 10
Juan de Fuca Basaltic Glass
Number of Data Lines: 5 Number of 'Good' Data Lines: 5
First/Last Date-Time: 11/11/2004 04:55:55 PM to 11/11/2004 05:06:58 PM

Average Total Oxygen:	43.790	Average Total Weight%:	99.343
Average Calculated Oxygen:	43.790	Average Atomic Number:	12.809
Average Excess Oxygen:	.000	Average Atomic Weight:	22.070
Average ZAF Iteration:	3.00	Average Quant Iterate:	3.00

Results in Elemental Weight Percents

SPEC:	O
TYPE:	CALC
AVER:	43.7900
SDEV:	.10338

ELEM:	Ca	Si	Al	Na	K	Fe	Ti	S	P	Ni	Mn	Mg
BGDS:	MAN	MAN	MAN	MAN	LIN	MAN	MAN	LIN	LIN	LIN	LIN	MAN
ABS%:	-3.48	-21.61	-26.61	-49.62	.00	-.29	-2.50	.00	.00	.00	.00	-35.87
TIME:	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00

ELEM:	Ca	Si	Al	Na	K	Fe	Ti	S	P	Ni	Mn	Mg	SUM
15	7.65475	23.7958	7.39514	1.98209	.16231	9.12237	.96974	.16762	.08598	.00507	.04794	3.99781	99.1256
16	7.64931	23.7441	7.39264	1.96989	.17020	8.81813	1.13566	.14287	.09453	.02029	.13018	4.00919	98.9833
17	7.67023	23.6587	7.42488	1.93465	.15238	9.02186	1.09259	.13852	.08592	.00000	.21747	4.07332	99.1748
18	7.70080	23.7525	7.39467	2.10569	.15194	9.14024	1.02494	.14412	.09455	.04818	.14112	4.10122	99.6734
19	7.77206	23.7884	7.42423	2.08669	.17793	9.05015	1.03510	.13045	.12601	.01014	.20417	4.02589	99.7585
AVER:	7.68943	23.7479	7.40631	2.01580	.16295	9.03055	1.05161	.14472	.09740	.01674	.14818	4.04149	99.3431
SDEV:	.05034	.05459	.01668	.07572	.01130	.12850	.06409	.01388	.01656	.01911	.06775	.04409	
SERR:	.02251	.02441	.00746	.03386	.00505	.05747	.02866	.00621	.00741	.00855	.03030	.01972	
%RSD:	.7	.2	.2	3.8	6.9	1.4	6.1	9.6	17.0	114.2	45.7	1.1	
PUBL:	7.94739	23.7501	7.44119	1.94365	.15773	9.20329	1.10907	.13500	.08728	n.a.	.17038	4.04631	99.7554
%VAR:	-3.25	-.01	-.47	3.71	3.31	-1.88	-5.18	7.20	11.59	.00	-13.03	-.12	
DIFF:	-.25796	-.00219	-.03488	.07215	.00522	-.17274	-.05747	.00972	.01012	.00000	-.02220	-.00482	
STDS:	358	298	374	336	374	395	22	757	285	28	25	12	
STKF:	.1693	.1849	.0701	.0735	.1132	.6779	.5547	.3690	.1599	.7502	.7341	.4736	
STCT:	2807.0	6650.6	2659.3	1728.1	1650.2	3309.5	1241.8	2716.6	778.3	3452.2	3325.8	16139.1	
UNKF:	.0713	.1848	.0532	.0100	.0015	.0766	.0090	.0012	.0007	.0001	.0012	.0261	
UNCT:	1181.8	6650.0	2017.9	233.9	21.5	373.8	20.1	8.6	3.4	.6	5.6	888.5	
UNBG:	12.7	26.6	21.3	8.5	9.8	5.9	1.6	3.3	1.7	8.2	4.4	14.3	
ZCOR:	1.0787	1.2848	1.3920	2.0257	1.1032	1.1792	1.1716	1.2418	1.4051	1.1759	1.1996	1.5501	
KRAW:	.4210	.9999	.7588	.1354	.0131	.1130	.0162	.0032	.0043	.0002	.0017	.0551	
PKBG:	93.78	250.62	95.70	28.66	3.21	64.45	13.27	3.68	3.09	1.08	2.35	63.00	
INT%:	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	