

G-probe 11 Summary Report
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A total of twelve labs submitted final results during this stage of the G-probe 11 study. Technique breakdown was, six labs used LA-ICP-MS, and four used SEM and two utilized EPMA. The material (DVA-1G) used in this study was actually the glass version of USGS reference material W-2. Conversion of W-2 to a glass (W-2G) was accomplished by melting 500 g of W-2 in a one liter platinum bowl at 1325° C over a period of six hours. The melting period also included two mixing intervals where the platinum bowl was removed from the oven and the molten mixture rapidly stirred for thirty seconds using a platinum rod. At the end of the melting period the molten material was poured into a platinum boat and rapidly lowered into a water bath for quenching. Twenty grams of random fragments were selected, ground and then split into representative aliquots. Samples were analyzed for their total element content using techniques at the USGS and SGS minerals, Canada. If you have any questions or comments about this study please forward them to me at your earliest convenience.

Below you will find summary results for each element studied in this test. In the element diagrams you will find information for each technique providing a value. Also included is the target value (◆) and calculated precision ($X \pm Ha$) (♦) based on the Horowitz equation. A figure is also presented representing the data compilation for the entire study when more than one technique reported values. The study average is represented by ■, the standard deviation of the average by ■ and the maximum and minimum values by □. This study average is calculated primarily for the analysis of the major elements where multiple techniques provided data. For each technique an average value is presented (ex LA-ICP-MS, ▲) as well as \pm one standard deviation (ex LA-ICP-MS, ▲), and the maximum and minimum values reported (ex LA-ICP-MS, Δ).

Table 1. Symbols used on figures 1 through 52

<u>Symbol type</u>		<u>Represents</u>
Large solid symbol,	●	Study or method average
Small solid symbol,	●	Study or method one standard deviation
Large open symbol,	○	Study or method Maximum or Minimum

Table 2. Summary results for GP-11, W-2G

Oxide	Xa % m/m	Ha % m/m	s.d.m. % m/m	GP-11 AVG. % m/m	Max % m/m	Min % m/m
SiO2	52.68	1.160	1.434	52.69	55.33	49.42
TiO2	1.06	0.042	0.134	1.03	1.15	0.54
Al2O3	15.45	0.409	0.602	15.37	17.29	14.39
Fe2O3T	10.83	0.303	0.633	10.78	12.19	9.81
Fe(II)OT	9.75	0.277	0.570	9.70	10.97	8.83
MnO	0.17	0.009	0.014	0.17	0.20	0.15
MgO	6.37	0.193	0.141	6.42	6.70	6.14
CaO	10.86	0.303	0.979	10.51	11.30	7.64
Na2O	2.20	0.078	0.107	2.25	2.47	2.08
K2O	0.63	0.027	0.086	0.61	0.71	0.30
P2O5	0.14	0.008	0.008	0.13	0.15	0.12

Element	Xa mg/kg	Ha mg/kg	s.d.m. mg/kg	GP-11 AVG. mg/kg	Max mg/kg	Min mg/kg
Ag	1.65	0.245	0.084	0.239	0.41	0.18
As	2.95	0.401	0.575	1.770	2.89	1.39
B	12	1.321	7.446	15.936	31.93	8.47
Ba	183.6	13.403	5.687	164.538	170.84	153.20
Be	0.99	0.159	0.280	0.921	1.43	0.60
Bi	0.26	0.051	0.009	0.045	0.06	0.03
Cd	0.19	0.039	0.101	0.249	0.48	0.15
Ce	25.4	2.497	1.255	22.917	24.51	20.01
Co	44.1	3.990	8.523	48.490	65.60	40.44
Cr	91	7.383	11.282	96.075	115.00	84.14
Cs	1.05	0.167	0.118	0.883	1.05	0.70
Cu	102	8.135	16.985	96.107	117.53	66.07
Dy	3.93	0.512	0.554	3.652	4.68	2.87
Er	2.37	0.333	0.351	2.152	2.83	1.61

Element	Xa mg/kg	Ha mg/kg	s.d.m. mg/kg	GP-11 AVG. mg/kg	Max mg/kg	Min mg/kg
Eu	1.37	0.209	0.070	1.054	1.14	0.91
Ga	17.6	1.828	9.852	23.237	45.92	15.02
Gd	3.81	0.498	0.479	3.526	4.42	2.73
Ge	2	0.288	3.807	3.492	11.89	1.01
Hf	2	0.288	0.357	2.407	3.07	1.82
La	11.8	1.302	0.755	10.230	11.92	9.01
Li	12.6	1.377	1.811	8.898	10.98	5.17
Lu	0.47	0.084	0.067	0.287	0.44	0.21
Nb	7.25	0.861	0.468	6.930	7.55	5.76
Nd	13	1.414	1.174	12.538	14.88	10.84
Ni	70	5.908	8.512	73.516	86.96	59.92
Pb	9.5	1.083	0.839	8.034	9.42	6.89
Pr	3.18	0.427	0.267	2.847	3.25	2.43
Rb	20	2.038	10.944	23.794	47.11	16.11
Sc	34	3.199	2.747	37.887	43.78	34.45
Sm	3.3	0.441	0.534	3.297	4.45	2.65
Sn	2.5	0.348	0.834	2.209	3.74	1.46
Sr	198	14.290	4.437	193.597	198.76	185.07
Ta	0.62	0.107	0.059	0.471	0.60	0.38
Tb	0.67	0.114	0.074	0.556	0.70	0.44
Tm	2.29	0.323	0.248	2.138	2.64	1.80
Th	0.41	0.075	0.052	0.302	0.40	0.22
U	0.76	0.127	0.030	0.506	0.55	0.46
V	260	18.011	19.724	275.137	304.71	244.20
Y	20.2	2.056	2.746	19.569	24.95	15.55
Yb	2.2	0.313	0.432	1.933	2.69	0.97
Zn	82.2	6.772	12.576	82.282	103.26	62.50
Zr	94	7.589	20.932	82.380	105.10	19.17

Xa = Target value - USGS bulk analysis of glass fragments and W-2 certificate values

Ha = Target precision calculated using modified version of Horowitz equation
for data quality 2 ($Ha = 0.01Xa^{0.8495}$)

s.d.m. = Standard deviation of population mean

mean = Mean element concentration for all techniques reporting

Max. = Maximum element/oxide concentration reported

Min. = Minimum element/oxide concentration reported











