

Instructions for OES Spectrometer Lab Report

The report for the lab should be **typed by a computer** and consist of:

- i. A **Cover Page** with "Student Name", "Student ID Number" and "Lab. Group".
- ii. An **Introduction** that briefly introduces the concept of qualitative and quantitative analysis for metals, discusses its importance in quantitative characterization, and clearly states the aims of the experiment. A background section that briefly discusses
 - a. Quantitative analysis methods for metals in general.
 - b. Spark OES analysis in detail.
- iii. **Equipment & Materials** which were used in the experiment
- iv. An **Experimental Procedure** section that carefully summarizes the method used.
- v. A **Results & Discussion** section. Calculate the mean quantity and standard deviation for each element in each analysis given to your lab. group specifically. Explain and discuss the analysis results, try to find out the material given to your lab. group.
- vi. References (American Ceramic Society Style, complete citation).

GROUP A

Meas.	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ag
	%	%	%	%	%	%	%	%	%	%
1	0.418	0.804	1.14	0.219	1.40	0.107	0.0449	5.17	0.0278	0.0011
2	0.418	0.805	1.14	0.220	1.40	0.106	0.0446	5.18	0.0276	0.0010
3	0.416	0.784	1.14	0.220	1.37	0.106	0.0442	5.18	0.0279	0.0011
4	0.418	0.801	1.15	0.220	1.40	0.105	0.0452	5.24	0.0274	0.0011
5	0.416	0.790	1.15	0.218	1.42	0.105	0.0447	5.26	0.0277	0.0011
6	0.418	0.795	1.15	0.219	1.41	0.105	0.0455	5.24	0.0282	0.0010

Meas.	B	Ba	Be	Bi	Ca	Cd	Ce	Co	Ga	Hg
	%	%	%	%	%	%	%	%	%	%
1	0.0014	0.00031	<0.00005	<0.00100	0.0038	0.0012	<0.0015	<0.00050	0.0103	<0.00100
2	0.0014	0.00031	<0.00005	<0.00100	0.0036	0.0012	<0.0015	<0.00050	0.0102	<0.00100
3	0.0014	0.00030	<0.00005	<0.00100	0.0035	0.0012	<0.0015	<0.00050	0.0102	<0.00100
4	0.0013	0.00029	<0.00005	<0.00100	0.0036	0.0012	<0.0015	<0.00050	0.0103	<0.00100
5	0.0013	0.00029	<0.00005	<0.00100	0.0037	0.0012	<0.0015	<0.00050	0.0103	<0.00100
6	0.0013	0.00032	<0.00005	<0.00100	0.0040	0.0012	<0.0015	<0.00050	0.0104	<0.00100

Meas.	In	La	Li	Mo	Na	P	Pb	Sb	Sn	Sr
	%	%	%	%	%	%	%	%	%	%
1	<0.00030	<0.00030	<0.00010	0.0013	0.0014	0.0012	0.0203	<0.0030	0.0068	<0.00010
2	<0.00030	<0.00030	<0.00010	0.0013	0.0014	0.0010	0.0203	<0.0030	0.0068	<0.00010
3	<0.00030	<0.00030	<0.00010	0.0013	0.0014	0.0012	0.0202	<0.0030	0.0066	<0.00010
4	<0.00030	<0.00030	<0.00010	0.0013	0.0014	0.0010	0.0204	<0.0030	0.0069	<0.00010
5	<0.00030	<0.00030	<0.00010	0.0013	0.0014	0.0010	0.0199	<0.0030	0.0069	<0.00010
6	<0.00030	<0.00030	<0.00010	0.0014	0.0014	0.0012	0.0203	<0.0030	0.0068	<0.00010

Meas.	V	Zr	Sc	Bg	Al
	%	%	%		%
1	0.0084	0.0138	<0.0500		90.5
2	0.0084	0.0137	<0.0500		90.5
3	0.0083	0.0139	<0.0500		90.6
4	0.0082	0.0136	<0.0500		90.5
5	0.0083	0.0137	<0.0500		90.4
6	0.0083	0.0134	<0.0500		90.5

GROUP B

Meas.	Zn	Pb	Sn	P	Mn	Fe	Ni	Si	Mg	Cr
	%	%	%	%	%	%	%	%	%	%
1	40.54	2.19	0.229	0.0013	0.0046	0.184	0.0694	<0.00060	0.00018	0.00021
2	40.47	2.21	0.228	0.0015	0.0046	0.182	0.0699	<0.00060	0.00025	0.00023
3	40.24	2.23	0.232	0.0012	0.0046	0.183	0.0700	<0.00060	0.00022	<0.00020
4	40.33	2.26	0.230	0.0015	0.0045	0.183	0.0691	<0.00060	0.00017	<0.00020
5	40.14	2.22	0.228	0.0015	0.0045	0.183	0.0693	<0.00060	0.00021	<0.00020

Meas.	As	Sb	Cd	Bi	Co	Al	S	Be	B	Se
	%	%	%	%	%	%	%	%	%	%
1	0.0054	<0.0030	0.0035	0.00078	<0.00100	0.0187	0.0024	<0.00010	0.00037	<0.00080
2	0.0053	<0.0030	0.0035	0.00076	<0.00100	0.0187	0.0024	<0.00010	0.00048	<0.00080
3	0.0053	<0.0030	0.0036	0.00098	<0.00100	0.0186	0.0026	<0.00010	0.00042	<0.00080
4	0.0060	<0.0030	0.0036	0.00084	<0.00100	0.0186	0.0025	<0.00010	0.00038	<0.00080
5	0.0053	<0.0030	0.0035	0.00073	<0.00100	0.0187	0.0026	<0.00010	0.00039	<0.00080

Meas.	Cu
	%
1	56.7
2	56.8
3	57.0
4	56.9
5	57.1

GROUP C

Meas.	C	Si	Mn	P	S	Cr	Mo	Ni	Al	Co
	%	%	%	%	%	%	%	%	%	%
1	0.211	0.0990	0.578	0.0073	0.0369	0.0916	0.0149	0.0915	0.0027	0.0094
2	0.179	0.0934	0.566	0.0066	0.0350	0.0909	0.0146	0.0891	0.0021	0.0091
3	0.190	0.0958	0.576	0.0067	0.0341	0.0917	0.0147	0.0908	0.0031	0.0088
4	0.181	0.0946	0.561	0.0059	0.0322	0.0909	0.0147	0.0889	0.0028	0.0092
5	0.182	0.0925	0.559	0.0069	0.0339	0.0909	0.0143	0.0887	0.0026	0.0084

Meas.	Cu	Ti	V	Pb	Sn	As	Bi	Ca	Sb	Te
	%	%	%	%	%	%	%	%	%	%
1	0.283	0.00046	0.0026	<0.00100	0.0151	0.0145	0.0019	0.00068	0.0086	0.0092
2	0.275	0.00044	0.0025	<0.00100	0.0138	0.0118	0.0019	0.00076	0.0088	0.0092
3	0.281	0.00049	0.0025	0.0010	0.0146	0.0124	0.0018	0.00050	0.0100	0.0097
4	0.275	0.00050	0.0026	<0.00100	0.0138	0.0111	0.0019	0.00040	0.0077	0.0087
5	0.274	0.00040	0.0024	0.0012	0.0137	0.0134	0.0019	0.00063	0.0085	0.0091

Meas.	B	Zn	N	Fe	Cew
	%	%	%	%	%
1	0.00044	0.0026	>0.0300	98.5	0.310
2	0.00032	0.0021	0.0118	98.6	0.273
3	0.00024	0.0020	0.0139	98.5	0.285
4	0.00039	0.0031	0.0153	98.6	0.275
5	0.00024	0.0043	0.0098	98.6	0.274

GROUP D

Meas.	Al	Sn	Zr	Mo	V	C	Si	Mn	Cr	Ni
	%	%	%	%	%	%	%	%	%	%
1	7.60	0.0154	<0.00100	<0.0040	4.94	0.0486	0.0276	<0.0050	0.0075	0.0050
2	7.02	0.0160	<0.00100	<0.0040	4.33	0.0603	0.0211	<0.0050	0.0060	0.0054
3	6.88	0.0157	<0.00100	<0.0040	4.33	0.0605	0.0218	<0.0050	0.0060	0.0050
4	7.01	0.0149	<0.00100	<0.0040	4.39	0.0598	0.0217	<0.0050	0.0061	0.0052
5	7.01	0.0144	<0.00100	<0.0040	4.41	0.0602	0.0152	<0.0050	0.0061	0.0058
6	7.03	0.0141	<0.00100	<0.0040	4.47	0.0620	0.0247	<0.0050	0.0065	0.0059

Meas.	Fe	Cu	Nb	Pd	Y	Ru	Ti
	%	%	%	%	%	%	%
1	0.0533	<0.0030	0.0435	0.0046	<0.00100	<0.0050	87.2
2	0.0558	0.0032	0.0305	0.0068	0.0055	<0.0050	88.4
3	0.0549	0.0031	0.0322	0.0071	0.0061	<0.0050	88.6
4	0.0541	0.0034	0.0321	0.0065	0.0056	<0.0050	88.4
5	0.0571	0.0030	0.0308	0.0070	0.0060	<0.0050	88.4
6	0.0624	<0.0030	0.0327	0.0062	0.0051	<0.0050	88.3

GROUP E

Meas.	C	Si	Mn	P	S	Cr	Mo	Ni	Al	Co
	%	%	%	%	%	%	%	%	%	%
1	0.146	0.199	0.524	0.0040	0.0026	0.225	0.0384	0.121	0.0287	0.0095
2	0.131	0.200	0.523	0.0047	0.0030	0.225	0.0388	0.121	0.0292	0.0100
3	0.134	0.197	0.523	0.0046	0.0030	0.225	0.0385	0.122	0.0282	0.0100
4	0.108	0.198	0.525	0.0046	0.0028	0.225	0.0387	0.122	0.0287	0.0098
5	0.105	0.198	0.526	0.0042	0.0024	0.226	0.0389	0.121	0.0286	0.0099

Meas.	Cu	V	Sn	As	Bi	Ca	Sb	Se	Te	Zn
	%	%	%	%	%	%	%	%	%	%
1	0.0104	0.0031	0.0118	0.0096	0.0062	0.0016	0.0068	<0.0010	0.0016	0.00057
2	0.0104	0.0031	0.0117	0.0123	0.0062	0.0018	0.0074	0.0011	0.0020	0.00069
3	0.0104	0.0030	0.0117	0.0119	0.0062	0.0016	0.0075	0.0017	0.0018	0.00052
4	0.0104	0.0030	0.0117	0.0106	0.0063	0.0016	0.0072	0.0014	0.0020	0.00051
5	0.0104	0.0027	0.0117	0.0094	0.0064	0.0013	0.0067	0.0014	0.0018	0.00067

Meas.	N	Fe
	%	%
1	0.0081	98.6
2	0.0085	98.6
3	0.0084	98.6
4	0.0104	98.6
5	0.0106	98.6

GROUP F

Meas.	Zn	Pb	Sn	P	Mn	Fe	Ni	Si	Mg	Cr
	%	%	%	%	%	%	%	%	%	%
1	38.53	1.27	0.0723	0.0062	0.0019	0.0990	0.0207	0.0155	0.00092	0.00056
2	38.69	1.29	0.0729	0.0061	0.0018	0.0975	0.0204	0.0153	0.00096	0.00037
3	38.82	1.30	0.0726	0.0059	0.0018	0.0974	0.0205	0.0153	0.00094	0.00031
4	39.17	1.39	0.0743	0.0075	0.0018	0.0956	0.0201	0.0140	0.00094	0.00036
5	39.51	1.35	0.0755	0.0072	0.0018	0.0947	0.0199	0.0141	0.00096	0.00038

Meas.	As	Sb	Cd	Bi	Co	Al	S	Be	B	Se
	%	%	%	%	%	%	%	%	%	%
1	0.0083	0.0056	0.0013	0.0013	<0.00100	0.679	0.0020	<0.00010	0.00051	<0.00080
2	0.0085	<0.0030	0.0014	0.0017	<0.00100	0.671	0.0020	<0.00010	0.00052	<0.00080
3	0.0077	<0.0030	0.0013	0.0015	<0.00100	0.670	0.0020	<0.00010	0.00054	<0.00080
4	0.0082	0.0059	0.0014	0.0015	<0.00100	0.658	0.0019	<0.00010	0.00050	<0.00080
5	0.0091	0.0058	0.0014	0.0017	<0.00100	0.653	0.0021	<0.00010	0.00053	<0.00080

Meas.	Cu
	%
1	59.3
2	59.1
3	59.0
4	58.5
5	58.2