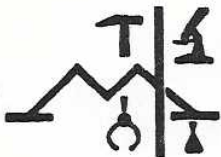


	Muscovite analyses	
	C.MUS Ceylon	M.MUS Madagascar
SiO ₂	45.26	44.47
TiO ₂	0.25	0.61
Al ₂ O ₃	34.38	27.48
Fe ₂ O ₃	1.70	5.09
FeO	1.13	1.39
MnO	0.020	0.90
MgO	0.64	1.57
CaO	0.055	0.070
BaO	0.073	0.19
Na ₂ O	1.13	0.86
K ₂ O	9.73	10.32
Rb ₂ O	0.076	0.070
Cs ₂ O	0.002	0.003
Li ₂ O	0.006	0.004
F	0.15	0.14
H ₂ O	5.16	5.58
	<hr/>	<hr/>
	99.762	98.747
O=F	- 0.06	- 0.06
	<hr/>	<hr/>
Total	99.70	98.69

Number of ions on the basis of 24(O,OH,F)

Si	6.0219	} 8.0000	6.1028	} 8.0000
Al	1.9781		1.8972	
Al	3.4130	} 3.8631	2.5475	} 3.7213
Ti	.0250		.0630	
Fe ³⁺	.1702		.5256	
Fe	.1257		.1595	
Mn	.0023		.1046	
Mg	.1269		.3211	
Ca	.0078		.0103	
Ba	.0038	.0102	} 2.0652	
Na	.2915	.2288		
K	1.6514	1.8066		
Rb	.0065	.0062		
Cs	.0001	.0009	} 5.1687	
Li	.0032	.0022		
F	.0631	} 4.6426	.0607	} 5.1687
OH	4.5795		5.1080	



Andrew S. McCreath & Son, Inc.

ANALYTICAL AND CONSULTING CHEMISTS

236-242 Liberty St., Harrisburg, Pa. 17101

TELEX: 84-2321

CABLE: McCREATH

TELEPHONE: (717) 238-9331

April 17, 1979

Virginia Polytechnic Institute and State University
Geothermal Program
1046 Derring Hall
Blacksburg, Virginia 24061

Gentlemen:

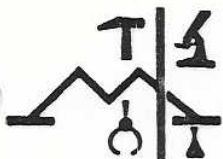
The samples received from you January 29, 1979 contained dried at 105°C:

	<u>Ceylon Muscovite</u>	<u>Madagascar Muscovite</u>
Silica	45.26 per cent	44.47 per cent
Titania	0.25 " "	0.61 " "
Alumina	34.38 " "	27.48 " "
Ferric Oxide Fe_2O_3	1.70 " "	5.09 " "
Ferrous Oxide FeO	1.13 " "	1.39 " "
Manganous Oxide	0.020 " "	0.90 " "
Magnesia	0.64 " "	1.57 " "
Calcium Oxide	0.055 " "	0.070 " "
Barium Oxide	0.073 " "	0.19 " "
Sodium Oxide	1.13 " "	0.86 " "
Potassium Oxide	9.73 " "	10.32 " "
Rubidium Monoxide	0.076 " "	0.070 " "
Cesium Monoxide	0.002 " "	0.003 " "
Lithium Oxide	0.006 " "	0.004 " "
Fluorine	0.15 " "	0.14 " "
Combined Water	5.16 " "	5.58 " "
	<hr/> 99.76	<hr/> 98.75

Yours very truly,

ANDREW S. McCREATH & SON, INC.

D. Berlin Jr.



Andrew S. McCreath & Son, Inc.

ANALYTICAL AND CONSULTING CHEMISTS

236-242 Liberty St., Harrisburg, Pa. 17101

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TELEPHONE: (717) 238-9331

April 18, 1979

Virginia Polytechnic Institute and State University
Geothermal Program
1046 Derring Hall
Blacksburg, Virginia 24061

SUBJECT: Outline of Methods

REFERENCE: Our Report dated April 17, 1979

Gentlemen:

Silica

Sodium Carbonate fusion; double perchloric acid dehydration.

Titania

Spectrophotometric - hydrogen peroxide.

Alumina

Aluminum hydroxide solution at pH 10.0 treated with potassium fluoride. The hydroxide equivalent to the aluminum titrated with standard hydrochloric acid.

Ferric Oxide

Total iron found by potassium dichromate titration minus the iron found in the Ferrous Oxide determination.

Ferrous Oxide

Sample treated with hydrofluoric acid and sulfuric acids in presence of standard Cerate solution. The excess Cerate titrated with standard ferrous sulfate using ferroin as indicator.

Manganous Oxide - Magnesia -
Calcium Oxide - Barium Oxide

Sample opened with hydrofluoric acid, nitric acid and perchloric acid. Analysis by atomic absorption in 5% hydrochloric acid.

Sodium Oxide - Potassium Oxide - Rubidium
Monoxide - Cesium Monoxide - Lithium Oxide

Sample opened with hydrofluoric acid, nitric acid, and perchloric acid. Analysis by flame emission.

Fluoride

Willard Winter Distillation. Fluoride determined in the distillate using fluoride specific ion electrode.

Combined Water

Sample heated at 1000°C in a tube furnace using argon carrier gas. Water absorbed in magnesium perchlorate.

SUPER RECAL

MUSCOVITE ANALYSES

	1	2
SiO2	45.26	44.47
TiO2	0.25	0.61
Al2O3	34.38	27.48
Fe2O3	1.70	5.09
FeO	1.13	1.39
MnO	0.02	0.90
MgO	0.64	1.57
CaO	0.05	0.07
BaO	0.07	0.19
Na2O	1.13	0.86
K2O	9.73	10.32
F	0.15	0.14
H2O	5.16	5.58
SUM	99.68	98.67
-O= F	0.06	0.06
SUM	99.61	98.61

SI	6.023	*	6.104	*
AL	1.977	8.000	1.896	8.000
AL	3.414	*	2.548	*
FE ³⁺	0.170	*	0.526	*
FE	0.126	*	0.160	*
MN	0.002	*	0.105	*
MG	0.127	*	0.321	*
TI	0.025	3.864	0.063	3.722
CA	0.008	*	0.010	*
BA	0.004	*	0.010	*
NA	0.292	*	0.229	*
K	1.651	1.955	1.807	2.056
H	4.580	*	5.109	*
F	0.063	4.643	0.061	5.170
O	24.000	*	24.000	*
F/M		1.008		0.823
F/FM		0.502		0.451

1 CEYLON MUSCOVITE

DATA REDUCTION BY METHOD OF BENCE & ALBEE:

ON SPECIMEN: CEYLON MUSCOVITE

ELEMENT	WEIGHT% (OXIDE)	STD.DEVI. (PERCENT)	FORMULA	K-RATIO	UNKN PEAK (COUNTS)	UNKN BKGD (COUNTS)	COUNTING TIME(SEC)
TI	KA	0.000	53.11	0.000	0.0000	442.2	10.00
MN	KA	0.000	494.04	0.000	0.0000	67.6	10.00
NA	KA	0.643	4.88	0.182	0.0525	542.7	10.00
CA	KA	0.004	345.76	0.001	0.0002	205.8	10.00
SI	KA	46.759	1.83	6.807	1.0828	6295.2	10.00
AL	KA	35.382	2.08	6.070	0.9703	4563.4	10.00
K	KA	9.665	1.03	1.795	0.6474	15999.9	10.00
MG	KA	0.214	14.68	0.046	0.0047	222.4	10.00
FE	KA	2.015	4.08	0.245	0.0277	810.2	10.00

TOTAL 94.683 24.000 OXYGENS ITERATIONS= 3

07-FEB-79 10:10:31

ANOTHER PT (Y,YES,K,NO) ?

INPUT SAMPLE DESCRIPTION (<CR> FOR NO CHANGE)?

MADAGASCAR MUSCOVITE

SELECT ANALYSIS POSITION AND PUSH BUTTON WHEN READY

DATA REDUCTION BY METHOD OF BENCE & ALBEE:

ON SPECIMEN: MADAGASCAR MUSCOVITE

ELEMENT	WEIGHT%	STD.DEVI.	FORMULA	K-RATIO	UNKN PEAK	UNKN BKGD	COUNTING	
	(OXIDE)	(PERCENT)			(COUNTS)	(COUNTS)	TIME(SEC)	
TI	KA	0.479	6.42	0.055	0.0120	1130.8	500.0	10.00
MN	KA	0.077	54.29	0.010	0.0046	93.6	70.0	10.00
NA	KA	0.355	7.02	0.105	0.0277	304.2	38.0	10.00
CA	KA	0.001	1215.06	0.000	0.0001	201.6	200.0	10.00
SI	KA	45.765	1.83	6.964	1.0714	6229.0	20.0	10.00
AL	KA	28.920	2.22	5.187	0.7717	3631.5	10.0	10.00
K	KA	10.868	0.99	2.110	0.7324	18080.4	150.0	10.00
MG	KA	1.501	3.90	0.340	0.0317	934.3	100.0	10.00
FE	KA	5.694	2.34	0.725	0.0785	2164.8	73.0	10.00

TOTAL 93.660 24.000 OXYGENS ITERATIONS= 3

07-FEB-79 10:12:08

ANOTHER PT (Y,YES,K,NO) ?

DATA REDUCTION BY METHOD OF BENCE & ALBEE?

ON SPECIMEN: CEYLON MUSCOVITE

ELEMENT	WEIGHT% (OXIDE)	STD.DEVI. (PERCENT)	FORMULA	K-RATIO	UNKN PEAK (COUNTS)	UNKN BKGD (COUNTS)	COUNTING TIME(SEC)	
TI	KA	0.000	44.99	0.000	0.0000	432.1	500.0	10.00
MN	KA	0.036	110.98	0.004	0.0022	81.1	70.0	10.00
NA	KA	0.775	4.42	0.217	0.0632	646.2	38.0	10.00
CA	KA	0.000	124.58	0.000	0.0000	184.3	200.0	10.00
SI	KA	46.759	1.83	6.757	1.0822	6291.8	20.0	10.00
AL	KA	35.876	2.08	6.110	0.9836	4625.6	10.0	10.00
K	KA	10.102	1.01	1.862	0.6769	16722.7	150.0	10.00
MG	KA	0.209	14.98	0.045	0.0045	219.4	100.0	10.00
FE	KA	1.929	4.18	0.233	0.0265	778.9	73.0	10.00
TOTAL		95.686						

24.000 OXYGENS

ITERATIONS= 3

07-FEB-79 10:08:28

ANOTHER PT (Y,YES,K,NO)

?K

ANOTHER PT (Y,YES,K,NO)

?Y

SELECT ANALYSIS POSITION AND PUSH BUTTON WHEN READY