Supplement of Eur. J. Mineral., 32, 101–119, 2020
https://doi.org/10.5194/ejm-32-101-2020-supplement

European Journal of Mineralogy
Open Access

Supplement of

Unusual silicate mineralization in fumarolic sublimates of the Tolbachik volcano, Kamchatka, Russia – Part 1: Neso-, cyclo-, ino- and phyllosilicates

Nadezhda V. Shchipalkina et al.

Correspondence to: Nadezhda V. Shchipalkina (estel58@yandex.ru)

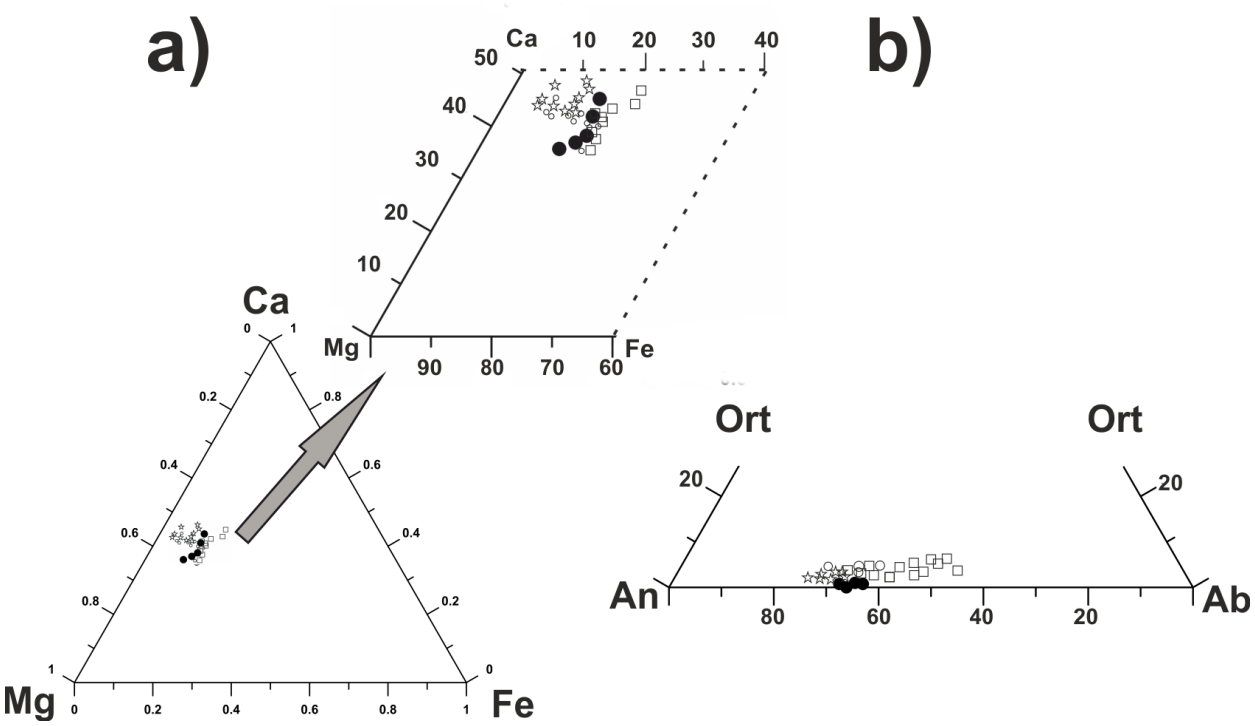

Fig. S1. Chemical features for Ca-Mg-Fe pyroxenes (a, with magnified fragment) and feldspars (b) from basalts of Great Fissure Tolbachik Eruption 1975–1976: ● – our data; ☆ – data for magnesium basalts from (Fedotov and Markhinin, 1983); □ – data for subalkaline alumina-rich basalts from (Fedotov and Markhinin, 1983).

Table S1**.** Chemical composition of minerals and glass composing non-altered by fumarolic gas basalt scoria which hosts the Arsentnaya fumarole

Component	**Ol**	**Cpx**	**Cpx**	**Cpx**	**Cpx**	**Cpx**	**Pl**	**Pl**	**Pl**	**Pl**	**Glass**
SiO_2	41.86	50.39	45.87	50.45	47.45	48.63	50.98	50.15	50.30	50.85	53.09
TiO_2		1.05	1.82	0.71	1.40	1.34					1.45
Al_2O_3		3.66	8.03	3.12	5.63	4.27	31.61	32.00	31.96	31.19	15.17
Cr_2O_3		0.13		0.43							
FeO*[1]	0.77	9.33	8.87	8.24	9.28	9.94	0.99	1.05	0.99	1.08	12.99
MnO	0.35	0.32	0.20	0.21	0.23	0.26					
NiO	0.24										
CuO	0.38										
MgO	56.23	16.18	12.87	17.63	13.95	15.14	0.24	0.23	0.26	0.23	4.26
CaO	0.16	17.42	20.47	17.17	19.17	17.80	13.19	13.71	13.53	12.80	5.15
Na_2O		0.36	0.30	0.19	0.33	0.38	3.73	3.39	3.58	3.87	5.02
K_2O		0.07					0.17	0.13		0.13	1.23
P_2O_5											0.38
Total	99.99	98.91	98.43	98.15	97.41	97.76	100.91	100.66	100.62	100.15	98.74
	Empirical formulae										
Si	0.99	1.89	1.75	1.89	1.82	1.85	2.31	2.28	2.28	2.32	
Ti		0.03	0.05	0.02	0.04	0.04					
Al		0.16	0.36	0.14	0.25	0.19	1.68	1.71	1.71	1.67	
Cr		0.00		0.01							
Fe^{2+}	0.02	0.29	0.28	0.26	0.30	0.32	0.04	0.04	0.04	0.04	
Mn	0.01	0.01	0.01	0.01	0.01	0.01					
Ni	0.00										
Cu	0.01										
Mg	1.98	0.90	0.73	0.99	0.80	0.86	0.02	0.02	0.02	0.02	
Ca	0.00	0.70	0.83	0.69	0.79	0.73	0.64	0.67	0.66	0.62	
Na		0.03	0.02	0.01	0.03	0.03	0.33	0.30	0.31	0.34	
K		0.00					0.01	0.01		0.01	
Σ_{cat}	3.01	4.02	4.03	4.02	4.03	4.03	5.02	5.02	5.02	5.02	
O (BoFC)	4	6	6	6	6	6	8	8	8	8	

Ol – olivine (forsterite), Cpx – clinopyroxene (Al- and Fe-bearing diopside), Pl – plagioclase (labrador); empty cell means content below detection limit; Σ_{cat} = sum of metal cations + Si; O (BoFC) is a basis of formula calculation, number of O atoms per formula unit; *[1]all iron is calculated as Fe^{2+}.

Table S2. Typical chemical composition of indialite (Ind), enstatite (En), diopside (Di), fluorophlogopite (FPhlg) from Mountain 1004.

Component	**Ind**	**En**	**En**	**Di**	**FPhlg**	**FPhlg**	**FPhlg**	**FPhlg**	**FPhlg**
	wt.%								
SiO_2	48.40	56.82	57.02	50.72	43.42	44.33	44.68	44.25	43.53
TiO_2	-	0.08	0.14	0.48	2.12	1.18	1.19	0.69	1.75
Al_2O_3	37.51	1.90	2.85	3.31	11.83	10.88	9.77	9.48	10.13
Fe_2O_3	0.55	2.74	2.61	5.76	1.65	1.38	5.94	3.46	5.75
MnO	-	0.79	0.58	0.48	-	-	-	0.03	-
CuO	-	0.28	0.34	-	-	0.20	2.16	5.86	0.44
ZnO	-	-	-	-	-	-	0.73	1.08	-
MgO	13.77	36.45	35.97	16.48	26.66	26.98	21.46	21.12	22.62
CaO	0.06	1.43	1.12	21.31	-	0.10	0.08	0.06	0.12
Na_2O	-	-	0.16	0.76	0.86	0.84	0.42	0.45	0.49
K_2O	-	-	0.16	-	10.24	10.01	10.06	9.77	9.78
F	-	-	-	-	7.83	8.06	8.27	8.25	8.15
Cl	-	-	-	-	0.05	0.10	0.09	0.08	0.11
$O=(F,Cl)_2$					3.31	3.42	3.50	3.49	3.46
Total	100.29	100.49	100.95	99.30	101.35	100.64	101.35	101.09	99.41
	Empirical formulae								
Si	4.73	1.93	1.92	1.86	3.02	3.10	3.17	3.18	3.11
Ti	-	0.00	0.00	0.01	0.11	0.06	0.06	0.04	0.09
Al	4.32	0.08	0.11	0.14	0.97	0.90	0.82	0.80	0.85
Fe^{3+}	0.04	0.07	0.07	0.16	0.09	0.07	0.32	0.19	0.31
Mn	-	0.02	0.02	0.01	-	-	-	0.00	-
Cu	-	0.01	0.01	-	-	0.01	0.12	0.32	0.02
Zn	-	-	-	-	-	-	0.04	0.06	-
Mg	2.00	1.84	1.81	0.90	2.77	2.81	2.27	2.27	2.41
Ca	0.01	0.05	0.04	0.84	-	0.01	0.01	0.00	0.01
Na	-	-	0.01	0.06	0.12	0.12	0.06	0.07	0.07
K	-	-	0.01	-	0.91	0.89	0.91	0.90	0.89
F^-	-	-	-	-	1.73	1.78	1.85	1.88	1.84
Cl^-	-	-	-	-	0.01	0.01	0.01	0.01	0.01
Σ_{cat}	11.09	4.00	4.00	3.99	7.99	7.97	7.76	7.83	7.77
BoFC	18 O	6 O	6 O	6 O	*1	*1	*1	*1	*1

Note. Dash means the content below the detection limit. Σ_{cat} = sum of metal cations + Si. BoFC is a basis of formula calculation: number of O atoms per formula unit (*apfu*), except of micas (*1) for which BoFC is O+F = 12 *apfu.*