



Supplement of

When detection and quantification of mineral fibres in natural raw materials are at their limit – the case of a clay from the Gomsiqe–Puka mining area (Albania)

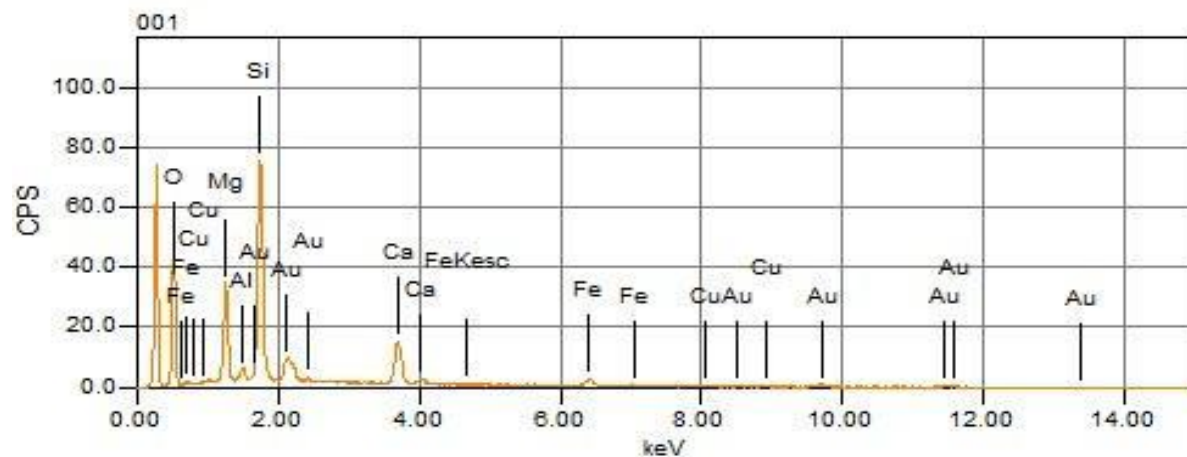
Alessandro F. Gualtieri et al.

Correspondence to: Alessandro F. Gualtieri (alessandro.gualtieri@unimore.it)

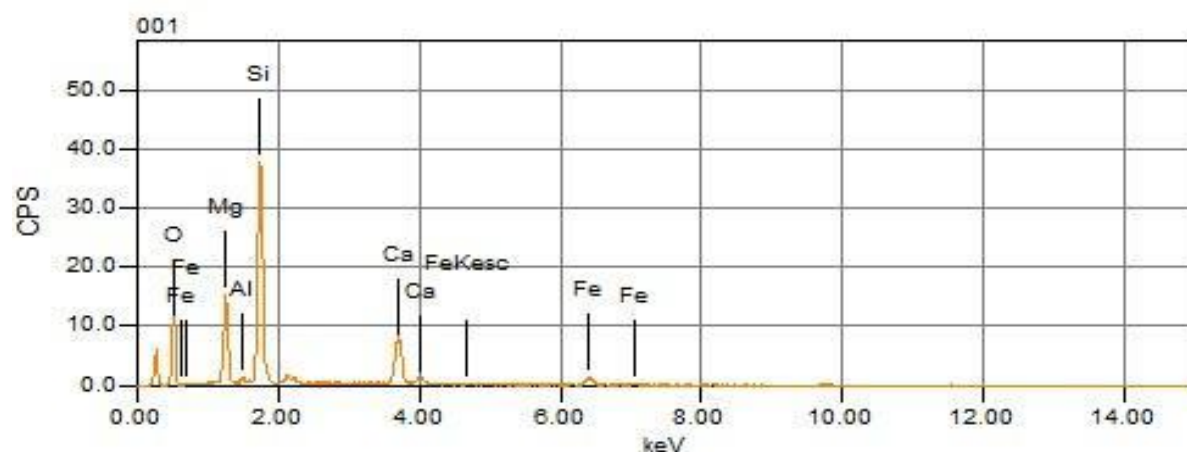
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Fig. S1. EDS spot analysis of the particles observed in Figure 4. **(a)** Chemical composition compatible with that of tremolite; **(b)** Chemical composition compatible with that of tremolite; **(c)** Chemical composition compatible with that of tremolite; **(d)** Chemical composition compatible with that of tremolite.

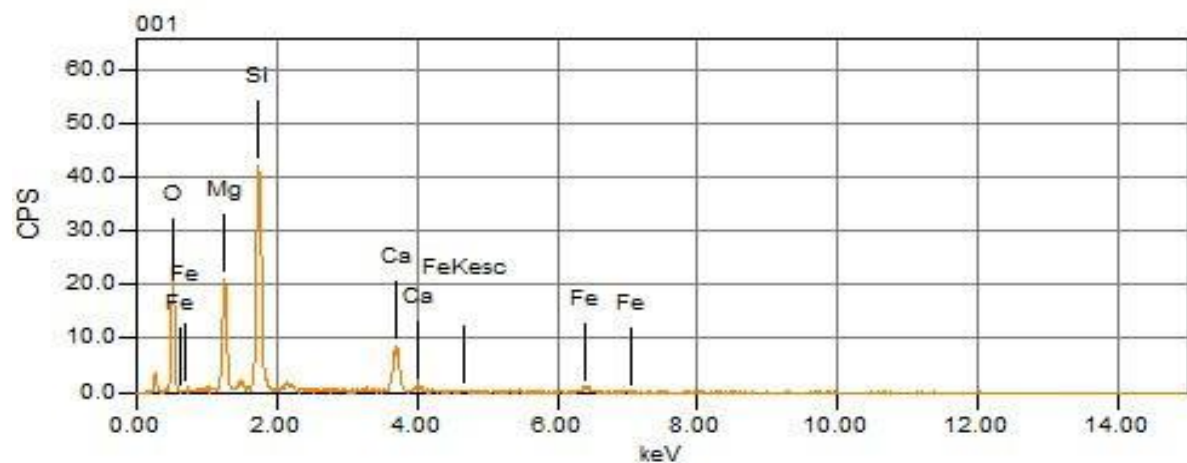
(a)



(b)



(c)



(d)

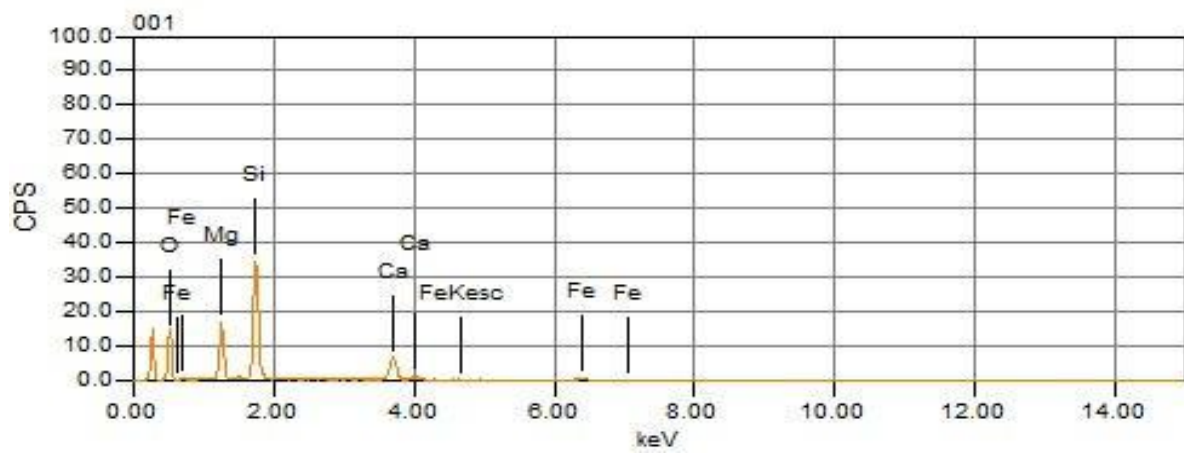


Fig. S2. Gallery of SEM images of various crystals. (a) acicular particle with chemical composition (see below) compatible with that of a mica; (b), (c), and (f) clay mineral particles; (d) titanium oxide; (e) cristobalite or quartz.

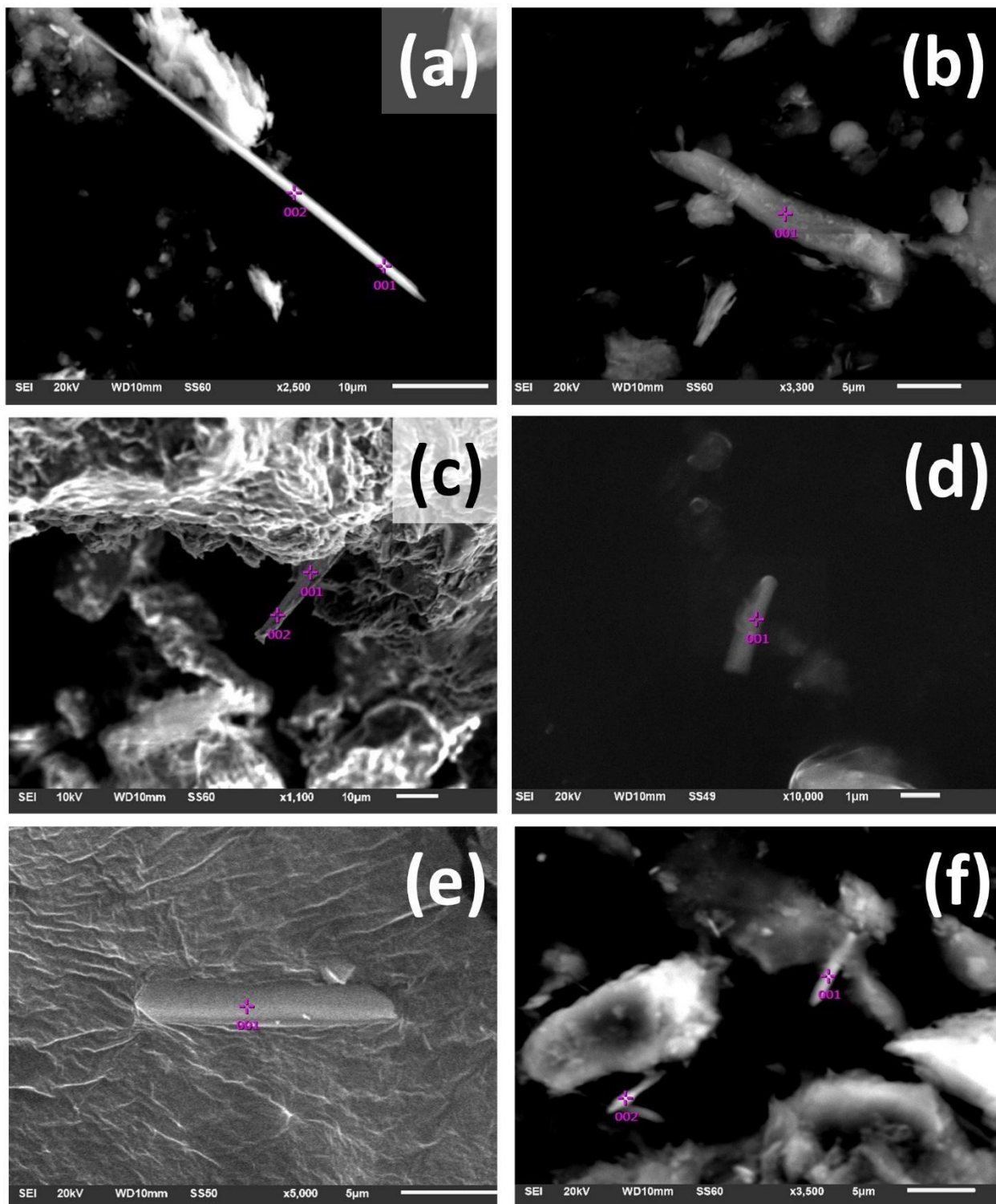
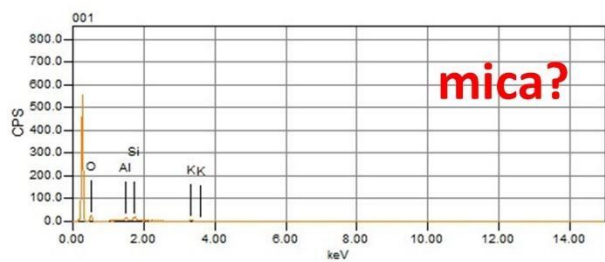
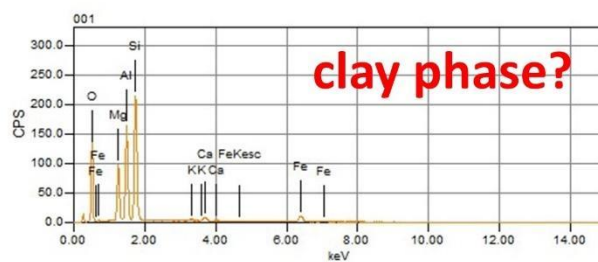


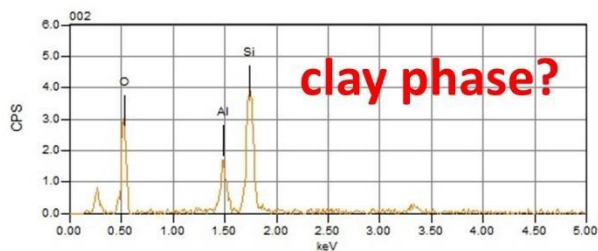
Fig. S3. EDS analyses of the SEM images reported in **Fig. S2.**



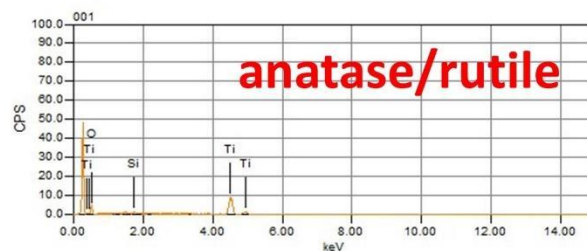
(a)



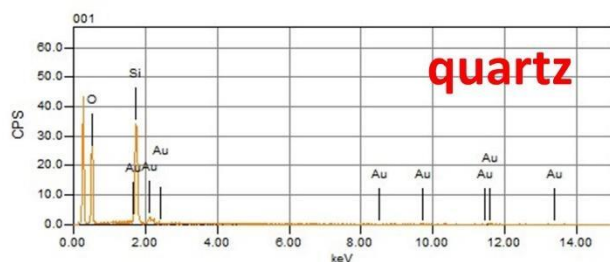
(b)



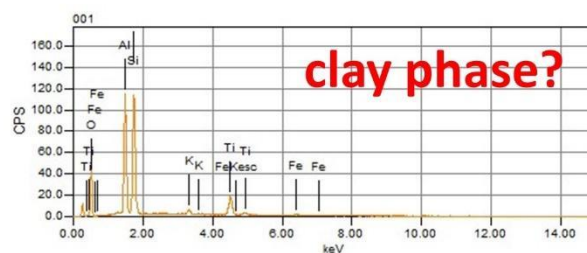
(c)



(d)



(e)



(f)

Table S1. Main thermal events occurring in the clay sample.

Label	Start (°C)	End (°C)	Max (°C)	Mass loss (wt%)	Evolved gas	Reaction type
A (*)	25	145	78	6.45	H ₂ O	Dehydration of smectite
B (*)	145	255	155	0.77	H ₂ O	Dehydration of smectite
C	255	370	nd	0.49	H ₂ O	Thermal decomposition of hydroxides
D (*)	370	537	496	3.94	H ₂ O	Dehydroxylation of kaolinite
E (*)	537	615	565	2.14	H ₂ O	Dehydroxylation of smectite
F (*)	615	700	635	0.89	CO ₂	Thermal decomposition of dolomite (first step)
G (*)	700	750	nd	0.19	H ₂ O, CO ₂	Dehydroxylation of tremolite (first step), thermal decomposition of dolomite (second step) and calcite
H	765	895	816	0.48	H ₂ O	Dehydroxylation of talc
I	950	1047	982	0.047	H ₂ O	Dehydroxylation of tremolite (second step)

(*) The reaction start/end temperature values are defined based on the DTG curve; however, as indicated in the text, due to the partial overlap of each of these reactions with the previous and/or subsequent reaction, each value is intended to be indicative. Similarly, the mass change given for each reaction also does not consider the partial overlap of the reactions. See text for further details.

Table S2. EPMA datasheets. **(a)** EPMA data – Al-rich tremolite (* <d.l.=below detection limit); **(b)** EPMA data – tremolite (* <d.l.=below detection limit); **(c)** EPMA data – diopside (* <d.l.=below detection limit).

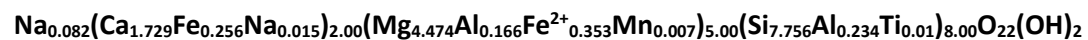
(a)

Point	Comment	SiO ₂	TiO ₂	Al ₂ O ₃	Cr ₂ O ₃	FeO	MnO	MgO	CaO	Na ₂ O	K ₂ O	BaO	tot
19	A-6	55.86	0.09	2.14	<d.l.	3.88	0.03	21.31	12.02	0.40	0.01	<d.l.*	95.74
32	A-19	54.06	0.10	3.94	<d.l.	4.65	0.04	21.37	10.92	0.47	0.02	<d.l.	95.55
34	A-21	57.05	0.09	2.07	0.03	4.12	0.06	21.03	11.50	0.40	0.01	<d.l.	96.34
36	A-23	55.72	0.16	2.50	0.01	4.50	0.13	21.16	11.43	0.61	0.03	0.01	96.25
37	A-24	55.38	0.09	2.10	<d.l.	3.75	0.05	22.97	11.75	0.47	<d.l.	0.03	96.57
38	A-25	55.13	0.06	2.34	<d.l.	4.07	0.07	22.87	11.62	0.38	<d.l.	<d.l.	96.54
31	A-18	57.37	0.06	2.00	<d.l.	3.67	0.07	20.42	12.03	0.20	0.01	0.02	95.84
	mean	55.79	0.09	2.44	0.01	4.09	0.06	21.59	11.61	0.42	0.01	0.01	

Cations calculated on the basis of 23 oxygen atoms

		Si	Al	Mg	Ca	Fe	Ti	Mn	Na
19	A-6	7.796	0.352	4.435	1.797	0.580	0.009	0.004	0.094
32	A-19	7.573	0.650	4.463	1.638	0.698	0.010	0.004	0.110
34	A-21	7.888	0.337	4.334	1.704	0.611	0.009	0.007	0.092
36	A-23	7.751	0.411	4.387	1.703	0.671	0.017	0.015	0.141
37	A-24	7.679	0.343	4.748	1.745	0.557	0.009	0.005	0.108
38	A-25	7.650	0.382	4.730	1.728	0.605	0.006	0.008	0.087
31	A-18	7.956	0.327	4.221	1.787	0.546	0.006	0.008	0.046
	mean	7.756	0.400	4.474	1.729	0.609	0.010	0.007	0.097

Calculated chemical formula



(b)

Point	Comment	SiO ₂	TiO ₂	Al ₂ O ₃	Cr ₂ O ₃	FeO	MnO	MgO	CaO	Na ₂ O	K ₂ O	BaO	tot
9	A-1	55.81	0.06	0.54	0.02	3.20	0.06	23.28	12.59	0.10	<d.l.*	<d.l.	95.65
11	A-3	55.19	0.06	0.66	0.04	3.06	0.09	23.85	12.39	0.16	0.01	0.01	95.52
20	A-7	56.44	0.01	0.53	0.02	2.74	0.07	23.32	12.50	0.14	<d.l.	0.03	95.78
23	A-10	57.41	0.03	0.78	0.02	3.23	0.11	20.66	12.52	0.19	0.02	0.01	94.97
24	A-11	55.93	0.06	1.00	0.02	3.43	0.07	21.15	12.36	0.25	<d.l.	<d.l.	94.28
31	A-18	56.59	0.05	1.26	0.01	3.75	0.09	21.03	12.47	0.24	0.01	<d.l.	95.49
35	A-22	59.93	0.07	1.37	0.02	3.50	0.09	17.63	11.96	0.26	<d.l.	0.01	94.83
	mean	56.75	0.05	0.88	0.02	3.27	0.08	21.56	12.40	0.19	<d.l.	0.01	

Cations calculated on the basis of 23 oxygen atoms

		Si	Al	Mg	Ca	Fe	Ti	Mn	Na
9	A-1	7.807	0.088	4.856	1.887	0.479	0.007	0.007	0.023
11	A-3	7.742	0.110	4.988	1.863	0.459	0.006	0.011	0.038
20	A-7	7.864	0.087	4.843	1.866	0.409	0.001	0.008	0.031
23	A-10	8.043	0.128	4.316	1.879	0.484	0.003	0.014	0.044
24	A-11	7.919	0.167	4.464	1.876	0.521	0.006	0.009	0.059
31	A-18	7.913	0.207	4.385	1.869	0.561	0.005	0.011	0.055
35	A-22	8.328	0.225	3.651	1.780	0.520	0.007	0.011	0.061
	mean	7.945	0.145	4.500	1.860	0.491	0.005	0.010	0.045

Calculated chemical formula

tremolite (Ca_{1.86}Fe_{0.096}Na_{0.045})_{2.001}(Mg_{4.5}Al_{0.095}Fe²⁺_{0.395}Mn_{0.01})_{5.00}(Si_{7.945}Al_{0.05}Ti_{0.005})_{8.00}O₂₂(OH)₂

(c)

Point	Comment	SiO ₂	TiO ₂	Al ₂ O ₃	Cr ₂ O ₃	FeO	MnO	MgO	CaO	Na ₂ O	K ₂ O	BaO	tot
39	B-4	52.16	0.31	2.96	0.54	4.29	0.19	15.94	22.05	0.35	0.01	0.01	98.79
40	B-5	52.42	0.33	3.02	0.64	4.70	0.11	16.18	22.00	0.37	0.01	<d.l.*	99.76
41	B-6	52.70	0.29	3.00	0.53	4.42	0.12	16.30	22.18	0.40	<d.l.	0.02	99.94
43	B-8	54.20	0.34	3.35	0.53	4.30	0.14	15.19	21.73	0.37	<d.l.	0.03	100.17
44	B-9	52.48	0.38	3.09	0.50	4.43	0.12	14.81	22.21	0.38	0.01	<d.l.	98.39
45	B-10	54.03	0.33	3.04	0.44	4.54	0.07	15.25	21.97	0.34	0.02	0.02	100.04
49	B-14	51.71	0.38	3.08	0.49	4.33	0.14	15.38	22.26	0.34	<d.l.	0.01	98.11
52	B-17	53.35	0.42	2.99	0.31	4.48	0.20	15.94	22.18	0.38	0.01	<d.l.	100.24
55	B-20	52.32	0.36	2.78	0.35	4.51	0.11	16.03	22.42	0.39	<d.l.	<d.l.	99.29
56	B-21	52.58	0.42	3.06	0.32	4.59	0.08	15.12	21.94	0.36	<d.l.	0.03	98.50
64	B-29	52.62	0.41	2.79	0.30	4.46	0.14	16.43	21.85	0.33	0.01	<d.l.	99.33
14	B-3	52.30	0.39	2.89	0.37	4.60	0.17	15.26	22.25	0.28	0.01	0.01	98.51
	mean	52.74	0.36	3.00	0.44	4.47	0.13	15.65	22.09	0.36	0.01	0.01	99.26

Cations calculated on the basis of 6 oxygen atoms

		Si	Al	Mg	Ca	Fe	Ti	Mn	Na
39	B-4	1.927	0.129	0.877	0.873	0.170	0.008	0.006	0.022
40	B-5	1.920	0.130	0.884	0.863	0.184	0.009	0.003	0.022
41	B-6	1.924	0.129	0.887	0.867	0.173	0.008	0.004	0.024
43	B-8	1.961	0.143	0.820	0.843	0.167	0.009	0.004	0.022
44	B-9	1.943	0.135	0.818	0.881	0.176	0.011	0.004	0.024
45	B-10	1.960	0.130	0.825	0.854	0.176	0.009	0.002	0.020
49	B-14	1.924	0.135	0.853	0.887	0.173	0.011	0.004	0.021
52	B-17	1.935	0.128	0.862	0.862	0.174	0.011	0.006	0.023
55	B-20	1.923	0.120	0.878	0.883	0.178	0.010	0.004	0.024
56	B-21	1.941	0.133	0.832	0.868	0.182	0.012	0.003	0.022
64	B-29	1.927	0.120	0.897	0.857	0.175	0.011	0.004	0.020

14	B-3	1.935	0.126	0.842	0.882	0.182	0.011	0.005	0.017
	mean	1.935	0.130	0.856	0.868	0.176	0.010	0.004	0.022

Calculated chemical formula

diopside **(Ca_{0.868}Fe_{0.111}Na_{0.022})(Mg_{0.856}Al_{0.075}Fe²⁺_{0.065}Mn_{0.004})(Si_{1.935}Al_{0.055}Ti_{0.01})₂O₆**