

## Appendix

*Selected microprobe analyses of olivines and calculated formulae (based on 4 oxygens)*

Locality	Mlado Nagorichane						Djurishite						Gradishite					
	phenocryst			phenocryst			phenocryst			microphenocryst			phenocryst			phenocryst		
	core	rim	core	rim	core	rim	core	rim	core	rim	core	rim	core	rim	core	rim	core	rim
SiO <sub>2</sub>	39.93	39.67	39.98	39.33	40.46	39.27	39.65	39.19	40.51	39.41	41.43	40.64						
FeO	13.90	14.46	14.18	14.34	11.16	16.25	17.96	17.33	9.49	14.75	6.60	18.63						
MnO	0.64	0.56	0.58	0.45	0.21	0.48	0.55	0.49	0.16	0.29	0.10	0.47						
MgO	45.69	44.79	45.15	44.74	48.65	44.43	42.89	43.72	49.62	45.26	52.20	38.90						
CaO	0.24	0.16	0.14	0.26	0.22	0.19	0.11	0.10	0.31	0.14	0.14	0.35						
NiO	n.d.	n.d.	n.d.	n.d.	0.29	0.07	0.13	0.25	0.37	0.33	0.59	0.21						
Cr <sub>2</sub> O <sub>3</sub>	n.d.	n.d.	n.d.	n.d.	0.02	0.00	0.02	0.07	0.03	0.03	0.08	0.03						
Total	100.40	99.64	100.03	99.12	101.01	100.69	101.31	101.15	100.49	100.21	101.14	99.23						
Si	0.996	0.999	1.001	0.996	0.990	0.988	0.998	0.987	0.990	0.989	0.992	1.043						
Fe	0.290	0.305	0.297	0.304	0.228	0.342	0.378	0.365	0.194	0.310	0.132	0.400						
Mn	0.014	0.012	0.012	0.010	0.004	0.010	0.012	0.010	0.003	0.006	0.002	0.010						
Mg	1.699	1.681	1.685	1.688	1.775	1.666	1.609	1.641	1.807	1.694	1.864	1.488						
Ca	0.006	0.004	0.004	0.007	0.006	0.005	0.003	0.003	0.008	0.004	0.004	0.010						
Ni	-	-	-	-	0.006	0.001	0.003	0.005	0.008	0.007	0.012	0.005						
Cr	-	-	-	-	0.000	0.000	0.000	0.000	0.001	0.001	0.002	0.001						
Total M1	2.009	2.002	1.998	2.009	2.019	2.024	2.005	2.025	2.021	2.022	2.016	1.914						
Fo%	85.4	84.7	85.0	84.8	88.6	83.0	81.0	81.8	90.3	84.5	93.4	78.8						

Locality	Kishino			Ejevo Brdo						Kureshnicška Krasta						
	microphenocryst			microphenocryst			phenocryst			phenocryst			micro-phenocryst			
	core	rim	core	core	rim	core	core	rim	core	rim	core	rim	core	rim	core	
SiO <sub>2</sub>	40.39	40.13	39.38	37.63	39.74	38.81	40.32	38.63	40.65	39.21						39.01
FeO	10.42	11.45	17.04	22.36	16.77	19.02	12.23	19.77	9.75	19.48						20.43
MnO	0.21	0.60	0.45	0.65	0.34	0.06	0.21	0.44	0.14	0.42						0.46
MgO	48.53	47.02	44.28	35.81	44.39	40.86	47.69	40.64	49.77	41.53						41.63
CaO	0.18	0.21	0.33	0.56	0.26	0.40	0.15	0.25	0.20	0.31						0.27
NiO	n.d.	n.d.	0.14	0.09	0.16	n.d.	0.21	0.08	0.28	0.18						0.10
Cr <sub>2</sub> O <sub>3</sub>	n.d.	n.d.	0.01	0.02	0.03	n.d.	n.d.	n.d.	0.01	n.d.						n.d.
Total	99.73	99.41	101.63	97.12	101.69	99.15	100.81	99.81	100.80	101.13						101.90
Si	0.996	0.999	0.985	1.013	0.991	1.000	0.993	0.996	0.990	0.996						0.988
Fe	0.215	0.238	0.357	0.503	0.350	0.410	0.252	0.426	0.199	0.414						0.433
Mn	0.004	0.013	0.010	0.015	0.007	0.001	0.004	0.01	0.003	0.009						0.010
Mg	1.784	1.745	1.651	1.437	1.650	1.570	1.750	1.563	1.807	1.573						1.572
Ca	0.005	0.006	0.009	0.016	0.007	0.011	0.004	0.007	0.005	0.008						0.007
Ni	-	-	0.003	0.002	0.003	-	0.004	0.002	0.006	0.004						0.002
Cr	-	-	0.000	0.000	0.001	-	-	-	-	-						-
Total MI	2.008	2.002	2.030	1.973	2.018	1.992	2.014	2.008	2.020	2.008						2.024
Fe%	89.3	40.13	82.2	74.1	82.5	79.3	87.4	78.6	90.1	79.2						78.4

*Selected microprobe analyses of clinopyroxenes and calculated formulae (based on 6 oxygens)*

Locality	Mlado Nagorichane						Djurishte						Gradishte					
	phenocryst*			micro- pheno.	phenocryst			micro- pheno.	phenocryst			micro- pheno.	phenocryst			micro- lite		
	core	rim	core		rim	core	rim		core	rim	core		rim	core	rim		core	rim
SiO <sub>2</sub>	54.48	51.97	53.35	54.20	50.77	52.85	53.53	52.64	54.31	52.64	53.60	52.34	53.02	53.60	52.34	52.93	52.00	52.33
TiO <sub>2</sub>	0.50	1.39	1.11	0.73	1.40	0.92	0.27	0.34	0.22	0.34	0.28	0.32	0.28	0.28	0.32	0.41	0.62	0.46
Al <sub>2</sub> O <sub>3</sub>	0.26	1.73	1.33	0.79	2.55	1.27	1.43	1.70	1.09	1.82	1.11	1.62	1.17	1.11	1.62	0.92	1.62	1.20
FeO	4.67	5.90	5.60	4.58	5.97	4.59	4.11	4.40	3.31	7.85	3.33	7.37	6.10	3.33	7.37	5.08	6.04	5.78
MnO	0.21	0.10	0.22	0.08	0.14	0.23	0.14	0.18	0.12	0.36	0.09	0.31	0.29	0.31	0.31	0.17	0.23	0.20
MgO	16.75	15.52	16.24	16.46	15.85	16.67	18.18	17.30	17.68	14.86	17.58	15.08	17.36	17.58	15.08	16.99	16.33	17.12
CaO	22.97	22.27	21.92	23.09	22.89	22.69	21.37	21.34	22.49	20.83	22.21	20.95	20.14	22.21	20.95	22.01	21.34	20.15
Na <sub>2</sub> O	0.49	0.70	1.00	0.33	0.61	0.49	0.45	0.41	0.28	0.57	0.28	0.62	0.25	0.28	0.62	0.28	0.37	0.29
K <sub>2</sub> O	0.13	0.20	0.07	0.16	0.11	0.03	0.04	0.00	0.00	0.02	0.02	0.00	0.00	0.02	0.00	0.00	0.02	0.02
Cr <sub>2</sub> O <sub>3</sub>	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0.02	0.00	0.18	0.03	0.09	0.00	0.00	0.09	0.00	0.04	0.00	n.d.
NiO	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0.05	0.00	0.05	0.00	0.03	0.02	0.02	0.03	0.02	0.05	0.03	n.d.
Total	100.46	99.78	100.84	100.42	100.29	99.74	99.59	98.31	99.73	99.32	98.62	98.62	98.63	98.62	98.63	98.88	98.60	97.55
Si <sup>4+</sup>	1.983	1.915	1.939	1.976	1.860	1.937	1.947	1.946	1.978	1.958	1.973	1.955	1.965	1.973	1.955	1.956	1.933	1.960
Al <sup>3+</sup>	0.011	0.075	0.057	0.024	0.110	0.055	0.053	0.054	0.022	0.042	0.027	0.045	0.035	0.027	0.045	0.040	0.067	0.040
Fe <sup>3+</sup>	0.006	0.010	0.004	0.000	0.030	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000
Al <sup>3+</sup>	0.000	0.000	0.000	0.010	0.000	0.000	0.009	0.020	0.025	0.038	0.021	0.027	0.016	0.021	0.027	0.000	0.004	0.013
Fe <sup>3+</sup>	0.013	0.038	0.063	0.000	0.046	0.025	0.062	0.044	0.000	0.026	0.008	0.045	0.021	0.008	0.045	0.040	0.056	0.024
Ti <sup>4+</sup>	0.014	0.039	0.030	0.020	0.039	0.025	0.007	0.009	0.005	0.010	0.008	0.009	0.008	0.008	0.009	0.011	0.017	0.013
Cr <sup>3+</sup>	-	-	-	-	-	-	0.001	0.000	0.005	0.001	0.003	0.000	0.000	0.003	0.000	0.001	0.000	-
Ni <sup>2+</sup>	-	-	-	-	-	-	0.001	0.000	0.001	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	-
Mg <sup>2+</sup>	0.909	0.853	0.880	0.895	0.866	0.912	0.920	0.927	0.962	0.824	0.959	0.839	0.954	0.959	0.840	0.936	0.905	0.950
Fe <sup>2+</sup>	0.064	0.070	0.027	0.075	0.049	0.038	0.000	0.000	0.002	0.101	0.000	0.079	0.000	0.000	0.079	0.010	0.017	0.000
Mg <sup>2+</sup>	0.000	0.000	0.000	0.000	0.000	0.000	0.066	0.027	0.000	0.000	0.006	0.000	0.005	0.006	0.000	0.000	0.000	0.007
Fe <sup>2+</sup>	0.057	0.058	0.066	0.065	0.049	0.066	0.063	0.092	0.099	0.116	0.095	0.107	0.168	0.095	0.107	0.103	0.115	0.157
Mn <sup>2+</sup>	0.006	0.003	0.007	0.002	0.004	0.007	0.004	0.006	0.004	0.011	0.003	0.010	0.009	0.003	0.010	0.005	0.007	0.006
Ca <sup>2+</sup>	0.896	0.880	0.854	0.903	0.899	0.891	0.833	0.846	0.877	0.831	0.875	0.838	0.800	0.875	0.839	0.872	0.850	0.809
Na <sup>+</sup>	0.035	0.050	0.070	0.023	0.043	0.035	0.032	0.029	0.020	0.041	0.020	0.045	0.018	0.020	0.045	0.020	0.027	0.021
K <sup>+</sup>	0.006	0.009	0.003	0.007	0.005	0.001	0.002	0.000	0.000	0.001	0.001	0.000	0.000	0.001	0.000	0.000	0.001	0.001
Wo	46.1	46.3	45.0	46.5	47.0	46.0	42.8	43.6	45.2	43.5	45.0	43.7	40.9	45.0	43.7	44.3	43.6	41.4
En	46.7	44.8	46.4	46.2	45.2	47.0	50.6	49.1	49.4	43.1	49.6	43.8	49.0	49.6	43.8	47.6	46.4	49.0
Fs	7.2	8.9	8.6	7.3	7.8	7.0	6.6	7.3	5.4	13.4	5.4	12.5	10.1	5.4	12.5	8.1	10.0	9.6
Mg <sup>#</sup>	0.88	0.87	0.90	0.86	0.90	0.90	0.89	0.88	0.91	0.85	0.90	0.85	0.84	0.90	0.85	0.87	0.84	0.84

\* They contain Cr<sub>2</sub>O<sub>3</sub> 0.22-0.35 wt.% according to Sveshnikova et al. (1986)

Locality	Ejevo Brdo										Kurešnička Krasta									
	phenocryst					microcline					phenocryst					micro-lite				
	core	rim	rim	rim	rim	core	rim	rim	rim	rim	core	rim	rim	rim	rim	core	rim	rim	rim	rim
SiO <sub>2</sub>	52.25	47.08	49.41	47.9	46.26	47.07	51.13	54.43	52.65	54.47	52.50	52.3	52.3	52.3	54.43	52.65	54.47	52.50	52.3	52.3
TiO <sub>2</sub>	1.29	3.51	2.30	2.59	3.25	2.86	1.48	0.36	0.78	0.38	0.83	0.59	0.59	0.59	0.36	0.78	0.38	0.83	0.59	0.59
Al <sub>2</sub> O <sub>3</sub>	1.68	5.42	3.60	4.18	6.41	4.95	2.98	0.62	1.55	0.58	1.48	0.43	0.43	0.43	0.62	1.55	0.58	1.48	0.43	0.43
FeO	5.44	6.90	6.20	7.07	6.91	7.39	5.85	3.15	4.19	2.99	5.07	4.94	4.94	4.94	3.15	4.19	2.99	5.07	4.94	4.94
MnO	0.17	0.01	0.38	0.21	0.25	0.13	0.09	0.11	0.09	0.11	0.15	0.27	0.27	0.27	0.11	0.09	0.11	0.15	0.27	0.27
MgO	16.32	13.72	14.67	14.27	13.02	13.82	15.93	18.01	16.74	18.22	16.30	17.54	17.54	17.54	18.01	16.74	18.22	16.30	17.54	17.54
CaO	22.46	22.83	22.37	23.34	22.94	21.53	22.63	22.98	22.52	23.02	22.33	23.68	23.68	23.68	22.98	22.52	23.02	22.33	23.68	23.68
Na <sub>2</sub> O	0.26	0.73	0.78	0.38	0.74	0.62	0.55	0.21	0.29	0.17	0.39	0.11	0.11	0.11	0.21	0.29	0.17	0.39	0.11	0.11
K <sub>2</sub> O	0.05	0.08	0.10	0.06	0.17	0.15	0.04	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00
Cr <sub>2</sub> O <sub>3</sub>	n.d.	n.d.	n.d.	0.0	0.0	0.06	0.07	0.16	0.51	0.26	0.25	n.d.	n.d.	n.d.	0.16	0.51	0.26	0.25	n.d.	n.d.
NiO	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Total	99.92	100.28	99.81	100	99.95	98.58	100.75	100.03	99.32	100.20	99.33	99.86	99.86	99.86	100.03	99.32	100.20	99.33	99.86	99.86
Si <sup>4+</sup>	1.920	1.738	1.823	1.775	1.715	1.768	1.861	1.976	1.938	1.973	1.936	1.913	1.913	1.913	1.976	1.938	1.973	1.936	1.913	1.913
Al <sup>3+</sup>	0.073	0.236	0.157	0.183	0.280	0.219	0.128	0.024	0.062	0.025	0.064	0.019	0.019	0.019	0.024	0.062	0.025	0.064	0.019	0.019
Fe <sup>3+</sup>	0.007	0.026	0.020	0.042	0.005	0.013	0.011	0.000	0.000	0.002	0.000	0.068	0.068	0.068	0.000	0.000	0.002	0.000	0.068	0.068
Al <sup>3+</sup>	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.005	0.000	0.000	0.000	0.000	0.000	0.003	0.005	0.000	0.000	0.000	0.000
Fe <sup>3+</sup>	0.013	0.068	0.065	0.000	0.000	0.121	0.097	0.011	0.020	0.011	0.040	0.000	0.000	0.000	0.011	0.020	0.011	0.040	0.000	0.000
Ti <sup>4+</sup>	0.036	0.097	0.064	0.072	0.091	0.081	0.041	0.010	0.022	0.010	0.023	0.016	0.016	0.016	0.010	0.022	0.010	0.023	0.016	0.016
Cr <sup>3+</sup>	-	-	-	0.000	0.000	0.002	0.002	0.005	0.015	0.008	0.007	-	-	-	0.005	0.015	0.008	0.007	-	-
Ni <sup>2+</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mg <sup>2+</sup>	0.893	0.756	0.807	0.788	0.720	0.773	0.860	0.971	0.918	0.970	0.896	0.957	0.957	0.957	0.971	0.918	0.970	0.896	0.957	0.957
Fe <sup>2+</sup>	0.058	0.079	0.064	0.140	0.189	0.023	0.000	0.000	0.020	0.001	0.034	0.027	0.027	0.027	0.000	0.020	0.001	0.034	0.027	0.027
Mg <sup>2+</sup>	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.004	0.000	0.014	0.000	0.000	0.000	0.000	0.004	0.000	0.014	0.000	0.000	0.000
Fe <sup>2+</sup>	0.090	0.040	0.043	0.036	0.020	0.077	0.069	0.084	0.089	0.078	0.084	0.056	0.056	0.056	0.084	0.089	0.078	0.084	0.056	0.056
Mn <sup>2+</sup>	0.005	0.000	0.012	0.007	0.008	0.004	0.003	0.003	0.003	0.003	0.005	0.008	0.008	0.008	0.003	0.003	0.003	0.005	0.005	0.008
Ca <sup>2+</sup>	0.884	0.904	0.884	0.927	0.911	0.867	0.882	0.894	0.887	0.893	0.882	0.928	0.928	0.928	0.894	0.887	0.893	0.882	0.882	0.928
Na <sup>+</sup>	0.019	0.052	0.056	0.027	0.053	0.045	0.039	0.015	0.021	0.012	0.028	0.008	0.008	0.008	0.015	0.021	0.012	0.028	0.008	0.008
K <sup>+</sup>	0.002	0.004	0.005	0.003	0.008	0.007	0.002	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000
W <sup>6+</sup>	45.5	48.9	47.2	48.8	49.3	46.5	46.1	45.5	45.8	45.4	45.5	47.0	47.0	47.0	45.5	45.8	45.4	45.5	47.0	47.0
En	46.0	40.9	43.0	41.5	38.9	41.5	45.1	49.5	47.4	50.0	46.2	48.4	48.4	48.4	49.5	47.4	50.0	46.2	48.4	48.4
Fs	8.5	10.2	9.8	9.7	11.8	12.0	8.8	5.0	6.8	4.6	8.3	4.6	4.6	4.6	6.8	6.8	4.6	8.3	4.6	4.6
Mg <sup>#</sup>	0.86	0.86	0.88	0.82	0.78	0.80	0.94	0.91	0.89	0.92	0.88	0.92	0.92	0.92	0.91	0.89	0.92	0.88	0.88	0.92

Selected microprobe analyses of *micus* and calculated formulae (based on 22 oxygens)

Locality	Mlado Nagoriclane				Djurishte				Gradishte				Kishino					
	poikilitic in the groundmass				microphenocryst		micro-lite		phenocryst		microphenocryst		microphenocryst					
Mineral	core	rim	core	rim	core	rim	core	rim	core	rim	core	rim	core	rim				
SiO <sub>2</sub>	35.21	34.86	33.44	34.26	34.06	39.87	39.88	39.19	38.98	39.49	40.17	40.69	40.69	40.27	37.60	36.70	38.14	38.30
TiO <sub>2</sub>	9.75	10.19	9.64	10.21	10.06	6.70	7.19	8.06	7.71	7.13	1.86	1.77	1.62	1.61	7.84	8.00	7.99	8.22
Al <sub>2</sub> O <sub>3</sub>	12.63	13.25	12.78	13.27	13.32	12.39	12.39	12.57	12.73	13.10	13.23	13.15	13.35	13.30	13.51	13.78	13.2	13.32
FeO	7.27	7.43	7.69	7.57	7.63	6.55	6.34	6.93	7.36	7.34	3.99	3.91	3.75	3.76	5.99	5.59	5.64	6.38
MnO	0.06	0.24	0.21	0.21	0.01	0.10	0.09	0.08	0.08	0.14	0.00	0.05	0.02	0.05	0.02	0.05	0.14	0.24
MgO	17.37	16.48	16.30	17.01	16.72	20.09	19.94	18.38	18.64	19.63	24.27	24.42	24.49	24.53	20.54	18.88	19.78	20.06
CaO	0.37	0.27	0.27	0.23	0.15	0.07	0.04	0.10	0.13	0.08	0.07	0.02	0.05	0.06	0.22	1.11	0.16	0.24
Na <sub>2</sub> O	0.84	0.76	0.79	1.11	1.11	0.77	0.87	0.80	0.71	0.71	0.46	0.55	0.29	0.32	1.44	1.25	1.60	1.16
K <sub>2</sub> O	8.06	7.46	7.87	7.36	7.38	7.82	8.09	8.05	8.41	8.39	8.66	8.75	8.97	8.72	8.41	7.97	7.74	8.62
Cr <sub>2</sub> O <sub>3</sub>	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0.03	n.d.	0.03	0.35	0.66	0.71	1.01	n.d.	n.d.	n.d.	n.d.
BaO	2.92	4.45	4.69	4.82	5.04	0.34	0.40	0.45	0.38	0.31	0.30	0.32	0.33	0.30	1.07	1.21	1.15	1.11
Total	94.48	95.39	93.68	96.05	95.48	94.70	95.23	94.64	95.13	96.35	93.45	94.29	94.30	93.93	96.64	94.54	95.54	97.65
Si	5.273	5.219	5.153	5.125	5.133	5.727	5.706	5.665	5.628	5.617	5.794	5.828	5.825	5.824	5.375	5.362	5.483	5.428
<sup>IV</sup> Al	2.229	2.338	2.321	2.339	2.365	2.097	2.089	2.141	2.166	2.196	2.206	2.172	2.175	2.176	2.276	2.372	2.236	2.225
<sup>IV</sup> Fe <sup>2+</sup>	0.498	0.443	0.526	0.536	0.502	0.176	0.205	0.194	0.206	0.187	0.000	0.000	0.000	0.000	0.349	0.266	0.281	0.347
<sup>VI</sup> Al	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.043	0.047	0.076	0.090	0.000	0.000	0.000	0.000
Ti	1.098	1.147	1.117	1.148	1.140	0.723	0.773	0.876	0.837	0.762	0.202	0.191	0.174	0.175	0.842	0.879	0.863	0.876
<sup>VI</sup> Fe <sup>3+</sup>	0.412	0.487	0.465	0.411	0.459	0.611	0.554	0.643	0.682	0.686	0.481	0.468	0.449	0.455	0.367	0.417	0.397	0.409
Mn	0.008	0.030	0.027	0.027	0.001	0.012	0.011	0.010	0.010	0.017	0.000	0.006	0.002	0.006	0.002	0.006	0.017	0.029
Mg	3.875	3.675	3.742	3.790	3.753	4.299	4.250	3.958	4.009	4.159	5.214	5.210	5.222	5.284	4.374	4.109	4.238	4.235
Ca	0.059	0.043	0.045	0.037	0.024	0.011	0.006	0.015	0.020	0.012	0.011	0.003	0.008	0.009	0.034	0.174	0.025	0.036
Na	0.244	0.221	0.236	0.322	0.324	0.214	0.241	0.224	0.199	0.196	0.129	0.153	0.080	0.090	0.399	0.354	0.446	0.319
K	1.539	1.424	1.547	1.404	1.418	1.432	1.476	1.484	1.548	1.522	1.593	1.598	1.637	1.608	1.533	1.485	1.419	1.558
Ba	0.171	0.261	0.283	0.282	0.297	0.019	0.022	0.025	0.021	0.017	0.017	0.018	0.020	0.017	0.060	0.069	0.065	0.062
Mg <sup>#</sup>	0.81	0.80	0.79	0.80	0.80	0.85	0.85	0.83	0.82	0.83	0.92	0.92	0.92	0.92	0.86	0.86	0.86	0.85

Locality	Ejevo Brdo						Kurešnička Kraša												
	micropheno- crysts		microlite		poicilitic in the groundmass*		poicilitic in the groundmass			phenocryst									
					rim	rim	rim	rim	core	rim	core	rim							
SiO <sub>2</sub>	33.41	32.98	32.80	32.20	32.95	33.47	32.75	32.47	36.42	38.45	34.76	34.31	36.21	35.12	35.04	36.57	39.77	36.42	38.45
TiO <sub>2</sub>	11.03	10.86	11.98	10.94	11.56	10.97	11.79	12.24	8.77	5.89	9.19	9.04	8.94	7.69	8.36	7.95	6.19	8.77	5.89
Al <sub>2</sub> O <sub>3</sub>	15.47	15.46	13.98	14.38	14.25	13.24	14.20	14.88	13.33	11.63	13.6	12.99	13.06	13.17	13.4	13.14	14.36	13.33	11.63
FeO	11.38	9.84	9.74	10.11	8.51	9.84	9.73	9.10	9.76	9.56	9.51	9.97	8.76	9.16	9.79	8.84	9.09	9.76	9.56
MnO	0.08	0.14	0.45	0.00	0.26	0.06	0.19	0.00	0.11	0.13	0.00	0.00	0.05	0.21	0.00	0.09	0.13	0.11	0.13
MgO	12.99	13.91	13.32	14.09	13.99	13.65	13.71	13.73	16.25	17.92	17.5	15.88	17.91	18.2	17.14	17.35	14.44	16.25	17.92
CaO	0.21	0.07	0.55	0.14	0.34	0.04	0.26	0.19	0.03	1.77	0.14	0.09	0.18	0.14	0.19	0.02	0.96	0.03	1.77
Na <sub>2</sub> O	0.56	0.59	0.36	1.00	0.64	0.62	0.87	0.78	0.58	0.51	0.69	1.09	1.10	0.68	0.91	0.60	0.85	0.58	0.51
K <sub>2</sub> O	5.96	5.81	6.61	6.38	6.97	7.26	6.49	6.58	7.39	8.26	7.89	8.29	8.38	7.90	8.19	7.41	8.06	7.39	8.26
Cr <sub>2</sub> O <sub>3</sub>	0.20	0.04	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0.02	n.d.	n.d.	n.d.	n.d.	n.d.	0.05	0.04	n.d.	0.02
BaO	8.22	8.21	5.78	6.43	5.83	5.13	6.36	6.98	3.95	0.15	3.50	3.49	3.30	3.39	3.43	3.76	0.07	3.95	0.15
Total	99.51	97.91	95.57	95.67	95.30	94.28	96.35	96.95	96.59	94.29	96.78	95.15	97.89	95.66	96.45	95.78	93.96	96.59	94.29
Si	4.972	4.950	5.008	4.940	5.022	5.159	4.976	4.907	5.381	5.672	5.146	5.207	5.280	5.249	5.219	5.409	5.814	5.381	5.672
<sup>iv</sup> Al	2.713	2.734	2.515	2.599	2.559	2.405	2.542	2.650	2.320	2.021	2.372	2.323	2.244	2.319	2.352	2.290	2.186	2.320	2.021
<sup>iv</sup> Fe <sup>2+</sup>	0.315	0.316	0.477	0.461	0.419	0.436	0.482	0.443	0.299	0.307	0.482	0.470	0.476	0.432	0.429	0.301	0.000	0.299	0.307
<sup>vi</sup> Al	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.974	0.653	0.000	0.000	0.000	0.000	0.000	0.000	0.288	0.000	0.000
Ti	1.234	1.225	1.375	1.262	1.324	1.271	1.347	1.390	0.906	0.872	1.023	1.031	0.980	0.864	0.936	0.884	0.680	0.974	0.653
<sup>vi</sup> Fe <sup>2+</sup>	1.100	0.919	0.766	0.836	0.665	0.832	0.753	0.707	0.014	0.016	0.695	0.795	0.591	0.713	0.790	0.792	1.111	0.906	0.872
Mn	0.010	0.018	0.058	0.000	0.034	0.008	0.024	0.000	3.576	3.937	0.000	0.000	0.006	0.027	0.000	0.011	0.016	0.014	0.016
Mg	2.880	3.110	3.029	3.220	3.176	3.134	3.103	3.091	0.005	0.280	3.859	3.590	3.890	4.052	3.803	3.822	3.145	3.576	3.937
Ca	0.033	0.011	0.090	0.023	0.055	0.007	0.042	0.031	0.166	0.146	0.022	0.015	0.028	0.022	0.030	0.003	0.150	0.005	0.280
Na	0.162	0.172	0.107	0.297	0.189	0.185	0.256	0.228	1.392	1.554	0.198	0.321	0.311	0.197	0.263	0.172	0.241	0.166	0.146
K	1.131	1.112	1.287	1.248	1.355	1.427	1.257	1.268	0.229	0.009	1.489	1.604	1.558	1.506	1.556	1.397	1.503	1.392	1.554
Ba	0.483	0.483	0.346	0.386	0.348	0.310	0.378	0.413	0.750	0.770	0.203	0.207	0.188	0.198	0.200	0.218	0.004	0.229	0.009
Mg <sup>#</sup>	0.67	0.72	0.71	0.71	0.75	0.71	0.72	0.73	0.70	0.73	0.77	0.74	0.78	0.78	0.76	0.78	0.74	0.75	0.77

\*the cores are opacitised

Selected microprobe analyses of feldspars and calculated formulae (based on 8 oxygens)

Locality	Mlado Nagorichane						Dziurshite			Gradshite						
	Na-samidine		Ba-Na samidine		Na-samidine		Na-samidine		anorthoclase		Na- to Ba-Na samidine					
	groundmass		miarolitic		after leucite	microclites	microclites				microclites					
SiO <sub>2</sub>	60.90	64.78	63.53	60.85	59.99	59.35	64.55	64.70	63.66	63.19	63.77	63.12	63.01	61.75	62.26	62.74
Al <sub>2</sub> O <sub>3</sub>	20.33	18.33	19.77	20.31	21.69	21.45	20.01	19.46	20.60	20.23	20.65	20.68	20.53	19.64	19.88	20.61
FeO	0.57	0.78	0.50	0.32	0.85	0.50	0.48	0.30	0.53	0.54	0.40	0.56	0.64	0.84	0.50	0.41
CaO	0.41	0.36	0.55	0.68	0.60	0.56	0.62	0.91	1.38	1.23	1.39	1.72	1.30	2.10	0.76	1.01
Na <sub>2</sub> O	4.40	3.58	5.15	5.35	4.39	4.65	4.76	5.88	4.86	5.21	4.91	5.62	5.76	4.81	4.01	4.57
K <sub>2</sub> O	7.97	11.23	8.68	8.07	8.42	8.01	7.92	8.05	9.76	6.95	7.10	6.00	5.59	7.48	7.71	7.85
SrO	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0.16	0.19	0.41	0.18	0.00	0.48	n.d.
BaO	5.19	0.00	0.89	1.63	3.87	5.37	0.10	0.00	0.48	0.37	0.47	0.50	1.73	1.43	0.58	2.47
Total	99.77	99.06	99.52	99.89	99.58	99.62	99.97	99.98	99.73	98.97	97.76	98.11	99.50	97.96	96.58	100.01
Si	2.862	2.981	2.922	2.904	2.839	2.806	2.801	2.920	2.900	2.912	2.904	2.890	2.888	2.888	2.916	2.881
Al	1.126	0.994	1.064	1.094	1.164	1.196	1.193	1.067	1.042	1.106	1.099	1.108	1.116	1.109	1.083	1.097
Fe <sup>2+</sup>	0.020	0.027	0.019	0.011	0.022	0.030	0.020	0.016	0.011	0.018	0.019	0.014	0.019	0.022	0.030	0.018
Ca	0.021	0.018	0.027	0.033	0.030	0.028	0.031	0.044	0.032	0.067	0.061	0.068	0.084	0.064	0.105	0.038
Na	0.401	0.319	0.456	0.474	0.397	0.422	0.436	0.516	0.428	0.460	0.439	0.496	0.511	0.427	0.364	0.415
K	0.478	0.659	0.506	0.471	0.501	0.478	0.477	0.465	0.566	0.404	0.417	0.349	0.327	0.437	0.460	0.460
Sr	-	-	-	-	-	-	-	-	-	0.004	0.005	0.011	0.005	-	0.013	0.004
Ba	0.096	0.00	0.016	0.029	0.065	0.071	0.099	0.002	0.000	0.009	0.007	0.008	0.009	0.031	0.026	0.011
An	2.3	1.8	2.8	3.4	3.2	3.0	3.3	4.3	3.1	7.2	6.6	7.4	9.2	6.9	11.3	4.2
Ab	44.6	32.1	46.1	48.5	42.8	45.5	46.2	50.4	41.7	49.4	47.9	54.4	55.4	46.0	39.1	44.9
Or	53.1	66.1	51.1	48.1	54.0	51.5	50.5	45.3	55.2	43.4	45.5	38.2	35.4	47.1	49.5	50.9
Ch	9.6	0.0	1.6	2.9	6.5	7.1	9.5	0.2	0.0	0.9	0.7	0.9	1.0	3.2	2.7	1.1
																4.5

Locality	Kishino				Ejevo Brdo										Kureshnichka Krasta										
	Na-sandine		anorthoclase		Ba-Sr-plagioclase					Ba-Sr-feldspars					Na-sandine		sandine								
	micro	micro	micro	micro	rim	core	rim	rim	rim	rim	rim	rim	rim	rim	rim	rim	rim	rim	rim	rim	rim	rim	rim	rim	
SiO <sub>2</sub>	63.56	61.06	63.20	61.27	59.58	59.06	60.09	57.93	62.27	58.76	60.29	64.58	63.79	64.58	63.79	65.09	64.58	65.12	64.46						
Al <sub>2</sub> O <sub>3</sub>	19.4	21.55	21.52	22.11	24.47	24.43	24.27	24.86	23.42	23.46	23.2	20.09	22.63	20.09	22.63	18.99	20.09	19.14	19.30						
FeO	0.52	0.40	0.31	0.45	0.33	0.53	0.49	0.53	0.49	0.53	0.54	0.72	0.42	0.72	0.42	0.61	0.65	0.56	0.68						
CaO	0.54	1.24	1.34	2.36	5.21	4.02	4.68	4.00	3.69	2.51	4.22	0.50	2.91	0.50	2.91	0.46	0.50	0.19	0.34						
Na <sub>2</sub> O	4.72	5.63	6.30	7.80	7.34	6.06	7.22	6.14	7.64	5.25	7.40	4.92	7.24	4.92	7.24	4.06	4.92	2.69	4.05						
K <sub>2</sub> O	9.80	6.35	6.32	3.66	1.28	2.23	1.25	2.31	2.14	4.11	1.25	9.20	3.29	9.20	3.29	9.42	9.20	11.91	10.85						
SrO	n.d	n.d.	n.d.	n.d.	n.d.	1.97	1.35	2.72	0.54	3.04	0.68	n.d.	0.25	n.d.	0.25	n.d.	n.d.	0.21	n.d.						
BaO	0.39	2.23	0.94	0.87	0.42	1.84	0.64	2.11	0.37	2.94	0.39	0.18	0.11	0.06	0.11	0.06	0.18	0.03	0.18						
Total	98.93	98.46	99.93	98.52	98.63	100.14	99.99	100.60	100.56	100.6	97.97	100.19	100.64	100.19	100.64	98.69	100.12	99.85	99.86						
Si	2.930	2.834	2.861	2.802	2.701	2.694	2.708	2.655	2.772	2.719	2.752	2.923	2.827	2.923	2.827	2.977	2.925	2.973	2.944						
Al	1.054	1.179	1.148	1.192	1.307	1.314	1.289	1.343	1.229	1.279	1.248	1.072	1.182	1.072	1.182	1.024	1.072	1.030	1.039						
Fe <sup>2+</sup>	0.018	0.014	0.011	0.015	0.011	0.018	0.017	0.018	0.016	0.018	0.019	0.025	0.014	0.021	0.022	0.021	0.022	0.019	0.023						
Ca	0.027	0.062	0.065	0.116	0.253	0.196	0.226	0.196	0.176	0.124	0.206	0.024	0.138	0.023	0.024	0.023	0.024	0.009	0.017						
Na	0.422	0.507	0.553	0.692	0.645	0.536	0.631	0.546	0.660	0.471	0.655	0.432	0.622	0.360	0.432	0.360	0.432	0.238	0.359						
K	0.576	0.376	0.365	0.214	0.074	0.130	0.072	0.135	0.122	0.243	0.073	0.531	0.186	0.531	0.186	0.550	0.532	0.694	0.632						
Sr	-	-	-	-	-	0.052	0.035	0.072	0.014	0.082	0.018	-	0.006	-	0.006	-	-	0.006	-						
Ba	0.007	0.041	0.017	0.016	0.007	0.033	0.011	0.038	0.006	0.053	0.007	0.003	0.002	0.001	0.003	0.001	0.003	0.001	0.003						
An	2.6	6.5	6.6	11.3	26.0	22.8	24.3	22.4	18.4	14.9	22.1	2.5	14.6	2.4	2.5	2.4	2.5	1.0	1.7						
Ab	41.2	53.7	56.3	67.8	66.4	62.2	67.9	62.2	68.9	56.2	70.1	43.7	65.7	38.6	43.7	38.6	43.7	25.3	35.6						
Or	56.2	39.8	37.1	20.9	7.6	15.0	7.8	15.4	12.7	28.9	7.8	53.8	19.7	59.0	53.8	59.0	53.8	73.7	62.7						
Ch	0.7	4.1	1.7	1.5	0.8	3.67	1.2	4.1	0.7	6.0	0.7	0.3	0.2	0.1	0.3	0.1	0.3	0.1	0.3						

\*core – Ba-Sr anorthoclase, rim – plagioclase



*Selected microprobe analyses of fooides and calculated formulae (based of 6 oxigens for leucite, and 8 for nepheline)*

Locality	Mlado Nagorichane		Kishino				Ejevo Brdo				
	leucite	phenocryst	leucite		nepheline		leucite				
			microphenocryst	after leucite	miarolitic	microphenocryst					
SiO <sub>2</sub>	55.87	55.90	54.54	55.39	55.35	54.54	48.63	49.19	54.78	55.37	54.51
TiO <sub>2</sub>	n.d.	0.04	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0.27	n.d.	0.28
Al <sub>2</sub> O <sub>3</sub>	22.21	22.11	23.72	23.50	23.34	23.72	29.77	30.73	22.56	22.48	21.90
Fe <sub>2</sub> O <sub>3</sub>	0.98	0.49	0.63	0.51	0.56	0.63	0.99	0.84	0.82	0.40	0.63
MgO	n.d.	n.d.	0.56	0.14	0.19	0.56	n.d.	n.d.	n.d.	n.d.	n.d.
CaO	0.49	0.71	0.27	0.17	0.31	0.27	0.16	0.16	0.49	0.43	0.37
Na <sub>2</sub> O	0.14	0.06	0.37	0.47	0.35	0.37	17.41	16.40	0.49	0.20	0.06
K <sub>2</sub> O	20.04	20.54	18.85	19.71	19.47	18.85	2.34	2.52	20.67	20.94	21.59
BaO	0.27	0.14	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Total	100.00	99.99	98.94	99.89	99.57	98.94	99.30	99.84	100.08	99.82	99.34
Si	2.027	2.029	1.981	2.000	2.002	1.981	2.294	2.297	1.992	2.014	2.005
Ti	-	0.001	-	-	-	-	-	-	0.007	-	0.008
Al	0.950	0.946	1.016	1.000	0.995	1.016	1.656	1.691	0.967	0.964	0.950
Fe <sup>3+</sup>	0.030	0.015	0.019	0.015	0.017	0.019	0.035	0.030	0.220	0.011	0.170
Mg	-	-	0.030	0.008	0.010	0.030	-	-	-	-	-
Ca	0.019	0.028	0.011	0.007	0.012	0.011	0.008	0.008	0.019	0.017	0.015
Na	0.010	0.004	0.026	0.033	0.025	0.026	1.593	1.485	0.035	0.014	0.004
K	0.928	0.951	0.874	0.908	0.898	0.874	0.141	0.150	0.959	0.972	1.003
Ba	0.004	0.002	--	--	-	-	-	-	-	-	-

*Selected microprobe analyses of Fe-Ti oxides*

Locality	Djurishte		Gradishte		Ejevo Brdo		Kureshnickha Krasta						
	ilmenite	Ti-magnetite	Ti-magnetite	Ti-magnetite	Ti-magnetite	Ti-magnetite	Ti-magnetite	Ti-magnetite					
SiO <sub>2</sub>	0.97	1.35	0.04	0.02	0.36	0.00	5.59	19.11	19.55	0.07	0.09	0.06	0.12
TiO <sub>2</sub>	43.10	40.72	9.46	14.92	14.54	16.11	13.26	13.16	11.63	15.79	16.11	15.24	12.66
Al <sub>2</sub> O <sub>3</sub>	0.43	0.56	2.86	2.67	2.80	0.72	4.22	6.98	9.16	0.96	1.56	0.59	0.63
Cr <sub>2</sub> O <sub>3</sub>	0.19	0.00	0.03	0.06	0.07	0.13	0.14	0.05	0.13	0.00	0.00	0.03	0.00
FeO	41.70	45.85	77.17	71.31	70.08	75.22	64.63	52.60	49.22	75.84	74.87	77.05	79.00
MnO	0.84	0.49	0.65	0.78	0.84	0.78	0.80	0.53	0.59	0.82	0.66	0.68	0.86
MgO	4.31	3.08	3.51	5.12	5.06	1.76	3.09	1.72	3.03	2.42	3.16	1.88	1.78
CaO	0.07	0.07	0.08	0.05	0.16	0.20	1.08	0.39	1.81	0.00	0.07	0.08	0.01
Na <sub>2</sub> O	0.00	0.14	0.11	0.07	0.00	0.00	0.18	1.15	0.34	0.24	0.05	0.19	0.00
K <sub>2</sub> O	0.19	0.15	0.04	0.06	0.13	0.11	0.16	0.46	0.87	0.01	0.00	0.05	0.01
NiO	0.08	0.04	0.12	0.11	0.12	0.16	0.00	0.04	0.03	0.06	0.12	0.05	0.03
BaO	0.28	0.27	0.05	0.10	0.12	0.15	0.07	0.11	0.55	0.12	0.13	0.17	0.04
Total	92.16	92.72	94.12	95.27	94.28	95.34	93.22	96.30	96.91	96.33	96.82	96.07	95.14

