ROCK-FORMING MINERALS OF BATTONYA AND CSONGRÁD UNIT GRANITOIDS

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The crystalline mass of the Tisia Composite Terrane is characterised by granitoid ranges and anticline wings of middle and high grade metamorphites. This paper presents the results of a mineralogical analyses on the granitoid rocks originating from characteristic uplifts of the basement (Algyő-Deszk-Ferencszállás-Makó - [ADFM] High and Pusztaföldvár-Battonya - [PB] High) of the Békésia Terrane, Tisia Composite Terrane.

The granitoid samples of PB High are mainly of light grey, greenish grey colour. Most of them have a holocrystalline, inequigranular texture, however, some samples are of equigranular texture. The colour of ADMF High granitoid rocks is mainly light grey, subordinately pale rose-colour. Their texture is mostly holocrystalline, medium-grained inequigranular and equigranular. Based on the orientation of mica, in some places the studied rocks are characterised by a preferred orientation in terms of their texture. Concerning the mineral composition and texture of the rocks, significant differences cannot be detected, thus they can be considered of similar character (PÁL-MOLNÁR *et al.*, 2002a, b). The major rock forming minerals are quartz, K-feldspar, plagioclase feldspar and mica (biotite, muscovite). The usual size of minerals falls between 1-3 mm, however microcline porphyroblasts of 2-3 cm are not rare either. Accessory components are apatite, zircon, monazite, less frequently garnet and titanite. Secondary components are chlorite, sericite, carbonate, epidote, limonite and opaque minerals.

Rock forming and accessory minerals were investigated with electron microprobe analysis. Representative results on the minerals are presented in Table 1.

Table 1. Representative microprobe analyses of minerals from granites of Battonya- and Csongrád Unit

Sample	1610		1315		1315	1318	1241		1318	1214	1241	1214
Mineral	biotite				muscovite		feldspar			apatite		monazite
							fim	core				
SiO_2	36.8	37.3	35.6	35.9	45.7	47.7	68.2	65.9	65.0	0.38	0.17	SiO_2 0.83
TiO_2	2.99	3.08	2.91	3.19	1.28	0.46	-	0.06	0.07	0.02	nd	CaO 1.45
Al_2O_3	17.4	17.2	16.6	16.4	31.8	34.5	19.8	21.3	18.4	0.23	0.06	P_2O_5 28.9
FeO*	17.6	16.8	20.48	20.2	3.3	1.6	0.06	0.07	0	0.11	nd	La_2O_3 13.5
MnO	0.22	0.3	0.59	0.48	0.04	0.04	-	0.03	0.06	0.12	0.02	Ce_2O_3 28.0
MgO	9.5	8.8	8.2	8.4	0.7	0.7	-	0.04	nd	0.03	nd	Pr_2O_3 2.02
CaO	0.16	0.12	0.11	0.05	nd	0	0.87	2.59	0.04	52.6	52.7	Nd_2O_3 9.95
Na_2O	0.23	0.150	0.22	0.14	0.30	0.39	11.42	10.3	0.89	nd	0.51	ThO_2 8.88
K_2O	9.24	7.33	9.13	9.00	9.49	9.64	0.09	0.08	15.98	0.28	nd	
P_2O_5	nd	nd	nd	nd	nd	nd	-	-	nd	40.6	41.3	
Total	94.19	91.05	93.89	93.85	92.59	94.89			100.45	94.38	94.71	93.73
	Cations to 22 oxygens						Cations to 8 oxygens			Cations to 12 oxygens		Cations to 4 oxygens
Si	5.62	5.79	5.56	5.58	6.30	6.33	2.99	2.89	2.99	0.03	0.01	Si 0.034
Al	3.14	3.15	3.05	3.02	5.17	5.41	1.02	1.10	1.00	0.02	0	Ca 0.064
Al^{IV}	2.39	2.22	2.44	2.42	-	-	-	-	-	-	-	P 1.001
Al^{VI}	0.75	0.92	0.61	0.60	-	-	-	-	-	-	-	La 0.204
Ti	0.34	0.36	0.34	0.37	0.13	0.05	-	0	0	0	-	Ce 0.419
Fe	2.24	2.19	2.67	2.63	0.38	0.18	0	0	0	0	-	Pr 0.030
Mn	0.03	0.04	0.08	0.06	0.01	0.01	-	0	0	0	0	Nd 0.145
Mg	2.16	2.03	1.91	1.94	0.15	0.14	-	0	-	0	-	Th 0.083
Ca	0.03	0.02	0.02	0.01	-	0	0.04	0.12	0	4.70	4.68	
Na	0.07	0.05	0.07	0.04	0.08	0.10	0.97	0.87	0.08	-	0.08	
K	1.80	1.45	1.82	1.79	1.67	1.63	0	0	0.94	0.03	-	
P	-	-	-	-	-	-	-	-	-	2.87	2.90	

nd - not detected element; FeO* - as total iron

The dominant mineral assemblages are feldspars and micas. K-feldspar and microcline are abundant in the studied granites, and orthoclase is generally present as well. The often zoned plagioclase feldspars of ADMF High granitoids are albite-oligoclase in composition, the plagioclases of PB High granitoid rocks are albite-andesine (Fig. 1).

The biotites of PB and ADMF High granitoids are rich in Fe (Fig. 2). Besides, biotites can also be considered as petrogenetic indicators for early stage granite genesis, since their Mg content reflects the grade of magma fractionation (HECHT, 1993). Parallel to proceeding magma fractionation the Mg content of biotites decreases while the Al^{VI} content remains constant, i.e. its value varies between 0.54 and 0.93. Thus, based on the composition of biotites ADMF granites are more fractioned than PB granitoids (Fig. 3). According to the Mg vs Al^{tot} ratio in biotites, the granites proved to be calc-alkaline.

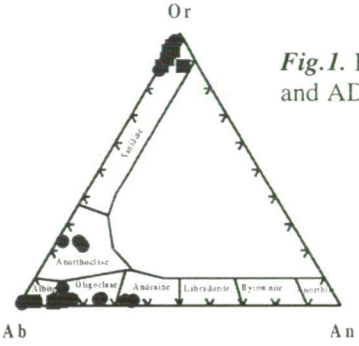

Fig.1. Feldspars from PB (●) and ADMF (■)granitoids.

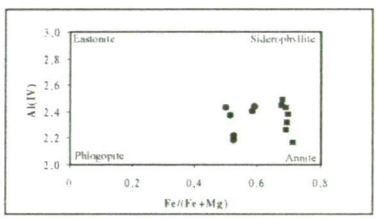

Fig. 2. Al^{IV} *vs.* Fe/(Fe+Mg) ratio in biotites from PB (●) and ADMF (■) granitoids.

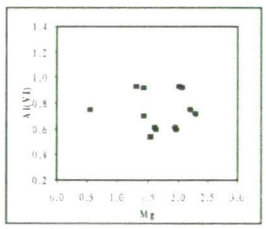

Fig. 3. Mg *vs.* Al^{VI} of biotites from PB (●) and ADMF (■) granitoids.

Acknowledgements

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References

HECHT, L. (1993). Münchener Geol Hefte, 10, 221.

PÁL-MOLNÁR, E., KOVÁCS, G. & BATKI, A. (2002a). Acta Mineralogica-Petrographica, Szeged, 42: 21-31.

PÁL-MOLNÁR, E., KOVÁCS, G. & BATKI, A. (2002b). Acta Mineralogica-Petrographica, Szeged, 42: 51-58.