

DIOCTAHEDRAL VERMICULITE IN THE BODA SILTSTONE FORMATION (BODA, MECSEK MTS., SW-HUNGARY)

DÓDONY, I. & LOVAS, GY. A.

Department of Mineralogy, School of Geology and Environmental Physics, Institute of Geography and Earth Sciences, Faculty of Sciences, Eötvös Loránd University, Pázmány Péter sétány 1/C, H-1117 Budapest, Hungary

E-mail: lovas@ludens.elte.hu

An interesting layer silicate assemblage containing smectite, vermiculite, chlorite and illite will be shown from a borehole of the title area. The XRD phase analysis of average samples showed that the main constituents are albitic claystone, alternating with siltstone, sandstone and dolomite. A detailed clay mineral analysis was performed on the $>2 \mu$ fraction of the samples. From the lowest depth downwards the following trend was observed for the clay minerals; smectite (swelling to $\sim 16 \text{ \AA}$ by EG [ethylene glycol] and to $\sim 17 \text{ \AA}$ by GLY [glycerine]), vermiculite (swelling to $\sim 16 \text{ \AA}$ by EG and no swelling by GLY), illite (slight decrease in d value from 10 \AA).

Going down some 10 m the swelling by GLY vanished indicating that no more vermiculite is present beside the smectite and illite. Another 10 m lower no more swelling by EG was found and a diffuse peak at 7 \AA appeared indicating the presence of chlorite. Going further down diffuse peak at $14\text{--}15 \text{ \AA}$, peak at 10 \AA and another diffuse peak at 7 \AA was only observed that showed no swelling effect except for the 10 \AA illite peak that continued showing slight decrease in d value from 10 \AA . Thus the XRD results indicated a peculiar layer silicate assemblage. To discover some more details ATEM and TEM investigation were undertaken. The crystallites showed morphological variety from platy, to lathy and fibrous habit. Each type was investigated by ATEM and chemical formula as well as layer charge was calculated based on the ATEM results. Except two out of some tens of crystallites the chemical composition was unambiguously interpreted as *smectite*. The calculated layer-charge showed the expected increasing trend downwards but in a depth range of some 40 m-s as compared to the similar trend in deep (several 1000s of m) basins. In some cases the layer charge calculation showed anomaly and therefore the formula calcu-

lation was reiterated. In these cases the feasible interpretation of the calculated formula is the presence of the fairly rare *dioctahedral vermiculite*. The peculiar XRD behaviour as well as the unexpected ATEM based chemical compositions suggest the presence of a peculiar structural interaction within the above phase assemblage and gives strong initiation for its further investigation on the unit cell level by SAED and HRTEM.

This research was undertaken within the T 32450 OTKA project whose financial support is greatly acknowledged.

References

- ÁRKAI, P., BALOGH, K., DEMÉNY, A. FÓRIZS, I., NAGY, G. & MÁTHÉ, Z. (2000): Acta Geologica Hungarica, 43: 351–378.
- BARABÁS, A. & BARABÁS-STUHL, Á. (1998): In: BÉRCZI, I. & JÁMBOR, Á. (ed.): Magyarország geológiai képződményeinek rétegtana (Stratigraphy of the geological formations of Hungary. In Hung.). Budapest: MOL Rt. & MÁFI, 187–215.
- MÁTHÉ, Z. (ed.) (1998): Summary report of the site characterization program of the Boda Siltstone Formation Manuscript (in Hung.) Mecsekérc Plc., Pécs. Vol. 4., p. 76.
- MOORE, D.M. & REYNOLDS, R.C., Jr. (1997): X-ray diffraction and the identification and analysis of clay minerals. Oxford: Oxford University Press.
- VARGA, A.R., SZAMÁNY, GY., RAUCSIK, B. & MÁTHÉ, Z. (2005): Acta Geologica Hungarica, 48: 49–68.
- VELDE, B. (1995): Origin and mineralogy of clays, clays and the environment. Berlin: Springer-Verlag.