

MINERALOGY AND CHEMISTRY OF SOME GLAUCONITES FROM POLISH FLYSCH CARPATHIANS DETERMINED BY INFRARED SPECTROSCOPY, SEM-EDS ANALYSES AND X-RAY DIFFRACTION

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Four samples of glauconites from flysch deposits of the Polish Outer Carpathians were studied for characterization of their most significant mineralogical and chemical features. Samples were collected from two cross-sections (near Ropica and Folsz) which are situated in the marginal, northern part of the Magura Nappe (Siary subunit). Glauconite host-rocks are sandstones of the Magura Beds, Lower Oligocene in age.

The glauconitic grains were separated using the following methods: glauconite-bearing rocks were disaggregated, submitted to magnetic separation, acetic acid treatment, purification by ultrasonic cleaning, and finally handpicking. The main properties (morphology, mineralogy and chemistry) of the green grains were studied by applying: optical microscopy, scanning electron microscopy (SEM-EDS), X-ray diffraction and IR spectroscopy.

The polycrystalline glauconitic grains occur mainly in the 50 µm – 500 µm size range. They are dark-green in colour and exhibit considerable variety in morphology. Most frequent morphological types are (according to TRIPLEHORN, 1966): spheroidal-ovoidal with smooth surface; tabular-discoidal; irregular shapes are also observed. XRD analyses of the oriented powder samples display the characteristic (001), (003), (112), (112) peaks of glauconitic minerals (ODIN & MATTER, 1981). The chemical data of the grains such as high K₂O content (average 7 to 8 wt%) and Fe₂O₃ content (up to 19 wt%) confirm their glauconitic nature. The mineralogical and the chemical evidences indicate that glauconitic grains of each sample reflect the evolved (or even highly evolved) stage of glauconitization.

The IR spectra were interpreted from a qualitative point of view, based on the data published by WIEWIÓRA & ŁACKA (1980). All the bands characteristic for the glauconitic minerals can be observed. The major Si–O_{basal} (990-1025 cm⁻¹) bands are shifted towards lower wavenumbers which indicates a low amount of expanding layers in the glauconitic minerals. Also the two distinct Si–O bands in the region between 990-1100 cm⁻¹ are clearly divided. In the region between 450-465 cm⁻¹ the bands of the samples containing more aluminium are shifted towards higher wavenumbers as compared with high-iron samples; all the samples have bands at around 3500 cm⁻¹ which indicate that they represent Fe-glauconites.

The IR spectra confirm the chemical and mineralogical data that the studied material represents the last stages of glauconitic evolution. In general, the differences between samples are not significant and they represent similar types from the point of view of maturity, morphology and crystal chemistry.

References

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WIEWIÓRA, A. & ŁACKA, B. (1980): *Arhiwum Mineral.*, **35**: 57-86.