

APPLICATION OF MICROANALYSIS (SEM-EDS) IN THE STUDY OF HEAVY MINERALS FROM RECENT STREAM ALLUVIA IN THE TATRA MTS.

Ladenberger, A.

Institute of Geological Sciences, Jagiellonian University, Oleandry 2a, 30-063 Kraków, Poland
e-mail: berg@geos.ing.uj.edu.pl

Heavy minerals from the recent alluvia in the upper parts of valleys in the Tatra Mts. were studied. Samples of alluvia were collected from six streams in the Tatra Mts. and examined using a scanning electron microscope fitted with an energy dispersive spectrometer (JEOL 5410 and NORAN Voyager 3100). Polished thin sections of heavy mineral fractions were prepared and studied in an optical microscope in transmitting and reflected light and examined in a scanning electron microscope fitted with a dispersive energy spectrometer (SEM-EDS).

Heavy minerals assemblages from recent alluvia in the Western Tatra Mts. are composed of garnets, opaque minerals (magnetite, ilmenite), amphiboles, zircon, tourmaline, and rutile. Xenotime and monazite occur in relatively high amount. Staurolite, apatite, and sillimanite are present as minor components. In the Western Tatras a relatively high content of sulphides was noted. Garnet grains are characterised by high content of almandine end-member (Alm 45-75 %); spessartite is also present in significant amount (Sps 5-55 %). Amphiboles are represented mostly by magnesio-hornblende. All sulphide grains (pyrite, Fe-Cu sulphides) are strongly oxidised. Heavy minerals assemblages from the High Tatra Mts. consist of apatite, epidote, ilmenite, magnetite, zircon, monazite, rutile, hematite, chlorite, allanite, titanite, prehnite, pumpellyite, sillimanite, pyrite, barite. Amphibole, prehnite, xenotime, allanite, barite and pyrite are scarce. Apatite grains exhibit variations in chemical composition (Mn and Cl content). Most Fe-Ti oxides exhibit complex intergrowths of very thin lamellae and lenses of Ti-ilmenite and rutile enclosed in Ti-hematite host.

Heavy mineral assemblages generally reflect the composition of accessory minerals (both primary and formed during hydrothermal alterations) present in source rocks. High abundance of crushed and irregular grains can be related to glacial transport and subsequent extraction of grains from moraines. Presence of grains with porous margins indicates intense leaching related probably to the activity of humic acids in alluvia. Scarcity of sulphide veins in the Western Tatras suggests that a relatively high content of oxidised sulphide grains in heavy mineral assemblages is related to their removal from old mine tailings present in upper parts of valleys.

Results of heavy minerals from alluvia in the Tatra Mts. can be important in the discussion on the origin of young clastic deposits in the Podhale and Orava basins (KIEBAŁA et al., 2001).

References

KIEBAŁA, A., KUSIAK, M., MICHALIK, M. & PASZKOWSKI, M. (2001): Polskie Tow. Mineral. - Prace Specj., **19**: 79-81.