

Molecular and mineralogical studies on internal sediment occurring with Zn-Pb ores from the Silesian-Cracow region, Poland

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An internal sediment (IS) - the organic matter (OM) rich sedimentary rock that fills caverns in the bottom parts of the ore bodies and open spaces between the collapse breccia fragments have been reported numerous times from the Silesian-Cracow Zn-Pb ores (e.g. Sass-Gustkiewicz 1996), but its position and origin in Silesian-Cracow deposits has not been resolved so far. Preliminary tests of IS from "Pomorzany" mine using X-ray diffraction (XRD), scanning electron microscope (SEM), gas chromatography coupled with mass-spectrometry (GC-MS), total organic carbon (TOC) and total sulfur (TS) measurements were carried out.

Based on XRD data and Rietveld refinements, the mineral composition of IS is highly variable with dolomite (28-89%wt) and gypsum (2-35%wt) as the main compounds. The average ore minerals (pyrite, sphalerite, marcasite) content is 10%wt. SEM studies show that IS samples contain only small amount of sphalerite, while galena is absent. These observations indicate that IS has been formed before or simultaneously with Zn-Pb deposit.

Geochemical investigations indicate that IS samples are OM rich (TOC= 7-15%), while contents of TS (2-20%) are highly variable and depend on the degree of sulfides mineralization. The study of OM extracts using GC-MS revealed their low thermal maturity. All of the IS samples contain hop-13(18)-enes, hop-17(21)-enes and 17 β ,21 β (H)-hopanes - compounds typical for an immature OM. The bimodal distribution of *n*-alkanes with peaks at *n*-C₁₇ and *n*-C₂₇ may indicate a multi-sourced origin of OM in IS from Silesia-Cracow Zn-Pb ores.

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[1] Sass-Gustkiewicz, M. (1996). Internal sediments as a key to understanding the hydrothermal karst origin of the Upper Silesian Zn-Pb ore deposits. [2] W: Sangster, D.F. (ed.), Carbonate-hosted Lead-Zinc Deposits Society of Economic Geologists, Special Publication 4, 171-181.