

Organic matter properties as factors controlling ore mineralization process in the Kupferschiefer, Lubin-Sieroszowice copper deposit, Poland

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The Kupferschiefer in the Polish Fore-Sudetic Monocline developed in the form of black shales, marls and shaly carbonates. In Lubin-Sieroszowice area it hosts one of the largest polymetallic deposits in the world [1]. The deposition in anoxic or suboxic shallow shelf conditions resulted in enrichment in organic matter (OM) which played an important role at the major stage of precipitation of copper minerals and precious metals [2]. The relation between geochemical indices of OM and distribution of minerals and metals in the Lubin-Sieroszowice Copper Deposit (LSCD) are discussed in this paper. Based on the results of Rock-Eval analysis conducted for 635 samples collected from 363 profiles in LSCD area, a spatial distribution of organic matter indices as total organic carbon (TOC), hydrogen index (HI), oxygen index (OI) and HI/OI ratio was determined. Values of these indices were used for identifying the reduced, transitional and oxidized zones within the Kupferschiefer strata [3]. The same samples were examined for qualitative and quantitative identification of ore minerals and metals (e.g., Cu, Ag, Au, Pb and Zn). There can be observed a straight correlation of elevated concentrations of Cu, Ag, Mo, Ni, Pb & Zn in the reduced zone (localised in eastern and northern part of the LSCD) with high TOC, HI and HI/OI and low OI values. The oxidised zone (low TOC, HI & HI/OI, high OI values) occurs in the south-western part of LSCD and is poor in above mentioned metals. Besides high concentrations of Au, Pt & Pd are also noted in that area. The transitional zone is worth exploring because of the usually high concentration of Cu, Ag, Mo, Ni, occasionally elevated Au, Pt and Pd contents and low amount of Pb and Zn. Organic matter is sensitive to oxidation processes which are connected with ores precipitation in the Kupferschiefer. Its properties change regularly with individual metal zonation and may be used for estimating deposit's extent.

[1] Wodzicki & Piestrzyński (1994) *Miner. Dep.* **29**, 30-43. [2] Piestrzyński (2007) Origin of ore deposit. In: KGHM Polish Copper SA Monograph, 228-244. [3] Więclaw et al. (2007) *PGI Bull.* **423**, 125-138.