INFLUENCE OF MINERAL COMPONENTS ON GEOCHEMISTRY OF HEAVY METALS IN SEDIMENTS OF THE WILGA RIVER

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The Wilga River is a tributary of the Vistula River. It flows into the Vistula River as the largest and the most polluted tributary in the Krakow area. Investigations of bottom sediments of the Wilga River were made on samples collected at the last of 1.5-km section of the river between the Rydlówka Street and the Vistula River.

The collected samples were divided into light (clays, quartz) and heavy fractions (iron oxide, oxysulphides, authigenic sulphides). Chemical analyses of samples were made with atomic absorption spectrometry (AAS) for Cr, Ni, Cu, Zn, Cd, Pb. Heavy fraction is enriched in (ppm): Zn 210–26839, Cu 95–13858, Pb 225–17939 & Cd 3–310. From the other hand the concentration of Cr and Ni is much higher in the light fraction (Cr up to 43, Ni up to 20 mg/kg).

Investigations with a field emission scanning electron microscope (FEMES) showed the presence of clay minerals intercalated with hydrated iron oxides and oxysulphides (Figs. 1, 2). The presence of covellite, chalcopyrite and pyrite in the heavy fraction was also confirmed.

Results obtained show, that the mineral composition of the investigated fluvial sediments is the basic factor controlling the distribution of heavy elements in fluvial bottom sediments in the Wilga River. The main heavy metal sorbents are hydrated iron oxides, iron oxysulphides and less clay minerals.

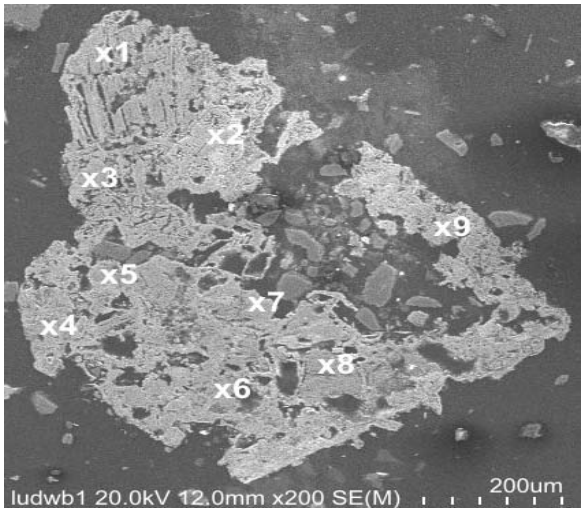

Fig. 1: SEM picture of syntaxial intergrowths of clay minerals (illite) with covellite and hydrated Fe oxides (1 & 3: pseudomorph of goethite after Cu-sulphide?, 2: goethite, 4 & 5: Fe oxysulphide with Pb, 6: Fe oxysulphide with Cu, 7 & 8: goethite, 9: Fe-oxysulphide with Pb).

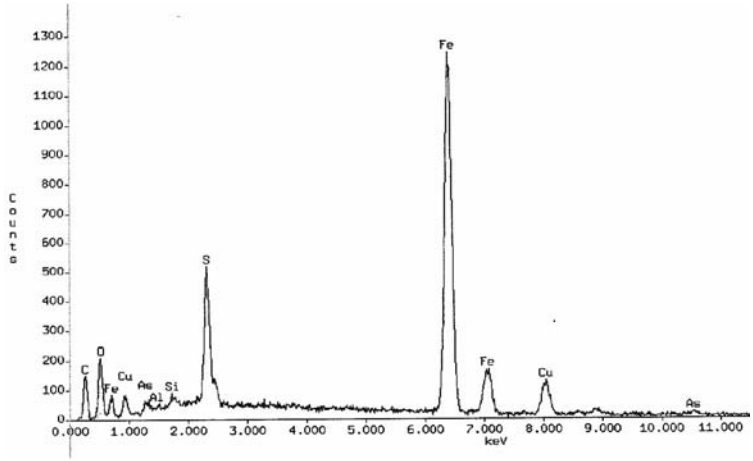

Fig. 2: Emission spectrum of Fe oxysulphide showing significant amounts of Cu and O, and important admixture of As.