Geochemistry of Post Processed Acidic Wastes and Bioaccumulation of Metals in Plants

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The central point of interest is an area 3,7 ha which comprises of two lagoons full of wastes which have originated from steel manufacture. These particular wastes are a result of chemical surface etching of steel with sulfuric acid. Post processed solutions, containing mostly iron sulfide and iron sulfate were neutralized by lime suspension and in the form of sludge deposited into lagoons. In some areas within the waste lagoons birch trees, grass and willow are present, while no such type of plants may be found in the vicinity. Waste samples as well as plant samples were taken and analyzed for the heavy metals concentrations. Furthermore, also plant samples from an unpolluted source were collected in order to compare concentrations of metals in both polluted and unpolluted plants environment. The results have shown that the ranges of pH (2,9 to 7,8) and Eh (-14 to 200 mV) values varied significantly within sampling points. In places where plants occurred, pH values of wastes were slightly acidic to neutral and Eh showed reducing conditions; however, in sampling points with no vegetation, pH values reflect the strong acidic (pH~3) and oxidizing conditions. According to IC analysis, all of the waste samples revealed a very high concentration of sulfate (1206-1411 mg/l) as well as phosphate ions (872-956 mg/l). Additionally, AAS analysis revealed a very high concentration of Fe (7-19%) and Zn (153-695 mg/kg) in all of the investigated waste sample. Furthermore, Fe as well as Zn concentrations in all plants samples were elevated when compared with plant samples collected from an unpolluted area. The preliminary experiments of acidic wastes neutralization and immobilization of metals were carried out using fly ash and sewage slug.

palabras clave: *residuos ácidos, bioacumulación de metales* ***key words:*** *acidic wastes, metal bioacumulation*

Environmental Impact of Industrial Wastes from Nitric Plant in Tarnów (Poland)

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The aim of our study was to determine concentration of Fe, Mn, Zn and Pb in the different type of wastes and a potential environmental risk connected with their disposals. The wastes (fly ash, soot, sludge and wastewater) were analyzed for buffer capacity, total trace metals concentrations and the aqueous leaching polutants. The total concentrations of trace metals in examined samples depend on metal, waste type and varied in very wide ranges: (mg/kg) 27-5260 of Pb, 50-3538 Zn, 103-6291 of Mn and 1779-60730 of Fe. The highest metal concentrations were found in samples of mixed wastes from Nitric Plant and sewage treatment plant, which are deposited in settling ponds. The aqueous leaching results showed very low metals concentrations. Only in the samples of soot higher concentrations of Zn (8,19 mg/dm^3) and Fe (56,4 mg/dm^3) were found. Concentrations of metals in wastewater were significantly higher than in aqueous leachate. Obtained values can be treated as first signal for assessing of possible metal mobilization. Sequential extraction of metals, performed to assess the potential mobility of metals in the waste samples, showed that Zn is the most mobile. X-ray diffraction of selected wastes showed the following phase composition of waste: quartz, illite, mullite, kaolinite smectite, calcite.

palabras clave: *residuos industriales, bioacumulación de metales* ***key words:*** *acidic wastes, metal bioacumulation*

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