

## **Abstract of dissertation thesis**

### **Exogenic alteration of geomaterials with anomalous content of hazardous elements**

The research of waste materials from high temperature processes belongs to current issues solved in the field of modern environmental geochemistry. Current research has mainly been focused on fly ash and bottom ash coming from metallurgy, combustion and other industrial processes. In these wastes of different grain size, accumulation of hazardous elements occurs. These elements may be present in low concentrations in combusted coal or municipal solid waste or it may come from ore processing. Hazardous compounds are also intentionally added during the technological process (e.g. making of lead glass). Modern industrial plants are equipped with effective filtration systems, but this might not be in the past. In the Czech Republic and elsewhere in the world old environmental burdens are and will be addressed. Current modern filtration systems are never 100% efficient. Contamination of surrounding environment in a lesser extent can still occur.

The production of lead glass (Bohemian Crystal) is based on the addition of lead compounds in the glass raw material. Additions of these substances providing a high refractive index of the finished product. Also compounds containing other hazardous elements (e.g. Ba and Sb) are added into the glass raw material. These compounds improve properties of glass.

During glass production emissions occur, which can settle into the surrounding environment (soil and biota). Emitted pollutants (e.g., Pb) particles are dissolved in environment containing water and atmospheric gases and releases Pb and other toxic substances into the surroundings. In this project we studied impact of production of glass with higher amount of lead to the environment (soil in the vicinity of glass-works in Světlá upon Sázava in the Czech Republic). Mobilization of these elements was studied using „*In situ*“ experiment in different types of soil with different vegetation cover. The transformation of fly ash in soils after its one year exposition was studied in these localities.

In this project we studied mobilization of Pb, Sb, Zn and Ba from fly ash particles released by glass-works in Světlá upon Sázava. Leaching of fly ash particles were concluded using low molecular weight organic acids and pH static leaching.

Leaching and „*In situ*“ experiment confirmed high mobility of Zn and Ba from the fly ash and less mobility of Pb and Sb in the soil environment.