Mineralogical and Geochemical Analysis of Medieval Lead-Silver Smelting Slags from Wiesloch near Heidelberg, Germany

Ströbele, Florian[1] Markl, Gregor[1]
[1] Universität Tübingen, AB Mineralogie und Geodynamik [2] Universität Tübingen, AB Mineralogie und Geodynamik

The carbonate-hosted MVT-deposit near Wiesloch (Heidelberg) was mined for lead and silver from the Roman period up to 1954. Associated smelting activities resulted in vast slag dumps with a total mass of at least 250 000 tons. Due to the long smelting activity, the contamination especially by Cd, Tl, Zn, Pb and As of soil and groundwater in the area of Wiesloch is extremely high. In the most contaminated areas Cd, Pb and Zn contents exceed 10 000 mg/kg, As content is about 7 000 mg/kg, Tl is just below 200 mg/kg and Cd content is 100 mg/kg (Hildebrandt 1998).

The aim of this study is to develop the barely known fundamentals of fayalitic low-silica slags in non-ferrous metal smelting. From all available sites and periods of time, slag samples were examined. The main phases in these slags are olivines (fayalite-kirschsteinite series), spinel (complex ss), wüstite, iscorite and leucite. To get the bulk chemistry, samples were ground, molten and quenched in water to produce a homogeneous mass. The chemistry of these quenched samples was determined using the EMP. The slags contain 25-40% SiO_2, 25-50% FeO, 3-9% Al_2O_3, up to 19% CaO. Some of the slags contain up to 23 % of ZnO which is – to our knowledge - the highest value recorded of a slag up to know and which reflects the fact that obviously Ag-bearing galmei or sphalerite was an important Ag ore in addition to the 'normal' galena. Cadmium and Thallium were lost completely, zinc and sulphur partly during melting of the slags. Therefore, we assume several sources of contamination around Wiesloch: the slag dumps leached by rainfall, the fumes released by the historic smelters, and, possibly, the ore body itself.

Using the data from bulk- and mineral chemistry, we will reconstruct the composition of a medieval furnace charge and improve our understanding of medieval smelting.

References

Hildebrandt, L.H. (1998): Schwermetallbelastung durch den historischen Bergbau im Raum Wiesloch. Dissertation, university of Heidelberg

→

Abs. No. **123**
Meeting: **DMG 2008**
submitted by: **Ströbele, Florian**
email: **florian.stroebele@uni-tuebingen.de**
date: **2008-05-29**
Req. presentation: **Vortrag**
Req. session: **S17**