

## Summary

There are many locations with historical mining wastes around the world that contain high concentrations of pollutants and harmful elements. Mineralogical composition of those wastes has a major impact on release and later migration of dangerous elements into surrounding environments, resulting in potential environmental risk. Goal of this master thesis is to characterize mobility and major sinks of arsenic in 50-years-old mining waste materials at Jedová mine near Vejprty and Dlouhá Ves mine near Havlíčkův Brod. For this purpose, solid waste and pore water samples were collected from both mining waste dumps. Solid samples were analysed by mineralogical (XRF, XRD, SEM-WDS and Raman microspectroscopy) and geochemical (sequential extraction) methods, while pore water samples were analysed using IPC-MS (cations), HPLC (anions) and spectrophotometry ( $\text{Fe}^{3+}/\text{Fe}_{\text{tot}}$  species). Arsenopyrite is the primary source of As at both localities. In the mining waste at Jedová jáma mine, As precipitates predominantly as amorphous ferric arsenate (HFA) and is also accumulated in scorodite and Fe (hydr)oxide (up to 3.2 wt.% of  $\text{As}_2\text{O}_5$ ). In Dlouhá Ves, due to weathering of large amount of sulphides (sphalerite, chalcopyrite, galena, pyrite and pyrrhotite), acidic conditions prevail ( $\text{pH} \sim 2.7$ ). Under this pH, the major part of arsenic bounds to Fe (hydr)oxides with approx. 1.7 wt.% of  $\text{As}_2\text{O}_5$  and Pb-rich jarosite. Pore water samples, collected after heavy rainfall events, had high arsenic concentrations ( $\sim 4.6 \text{ mg.L}^{-1}$ ) at the Jedová jáma mine, while its dissolved concentrations at Dlouhá Ves were negligible ( $\sim 1.5 \text{ } \mu\text{g.L}^{-1}$ ). High arsenic mobility in Jedová mine waste dump is supported by mineralogical and geochemical results; incongruent dissolution of HFA at slightly acidic conditions ( $\text{pH} \sim 4$ ) controls high concentration of aqueous As mobility in the pore waters percolating the waste dump. On the contrary, low arsenic mobility in the mining waste at Dlouhá Ves resulted from strong association of As with Fe (hydr)oxide and hydroxosulphates.