SUMMARY

This master thesis deals with selectivity assessment of an arsenic sequential extraction procedure for evaluating mobility in mine wastes. A modified sequential extraction procedure was designed on the basis of preliminary tests of extraction efficiency and selectivity for the synthetic As mineral phases (scorodite, amorphous iron arsenate, schwertmannite, goethite, jarosite) and five natural samples (Kaňk, Dlouhá Ves, Giftkies, Roudný) that were previously characterized for As concentration and speciation. The modified sequential extraction has five steps. The first leaching step was performed in nitrogen-purged deionized H_2O for 10 hours; next step involved 0.01M $NH_4H_2PO_4$ leaching for 16 hours. Phases in the third step were dissolved with 0.2M Tamm`s reagent in darkness for 2 hours. The fourth step was represented by 0.2M of Tamm`s reagent heated in water bath at 80°C for 4 hours. Strong acid solutions $HCl/KClO_3/HNO_3$ were used to leach sulphide phases in the last step. The testing of the sequential extraction procedure using model mixtures showed a good discrimination of several fractions: adsorbed arsenic, arsenic associated with poorly crystalline oxyhydroxide, hydroxosulfate and arsenate phases (amorphous iron arsenate, schwertmannite, ferrihydrite), arsenic associated with crystalline oxyhydroxide, hydroxosulfate and arsenate phases (scorodite, goethite and jarosite) and arsenic associated with sulphides. In combination with observed selectivity of reagents for synthetic As mineral phases, our modified sequential extraction procedure represents a method with rigorous quality assuarance. We feel that this sequential extraction is suitable for studies of binding and mobility of arsenic in mine waste.

Key words:

Arsenic, sequential extraction methods, mine waste, Fe arsenates, Fe oxyhydroxides, Fe hydroxosulfates