

SUMMARY

This thesis deals with the isotopic composition of lead and 210 lead in recent galena from burning heaps after coal mining in the Lower Silesian basin. The studied sites were heaps in Radvanice, Markoušovice and Rybníček, where samples of galena, coal and burnt rocks were available.

For the determination of the isotopic composition was used mass spectrometry with inductively coupled plasma (ICP - MS). Mass ^{210}Pb activity in galena was measured in a gamma - spectrometer Silar and the effect of radioactivity on galena crystal lattice was determined by the modified Williamson - Hall graph which was made from taken X-ray diffraction data.

The values of isotope ratios in galena ranged for $^{207}\text{Pb}/^{206}\text{Pb} = 0,8402$ to $0,8435$ and for $^{208}\text{Pb}/^{206}\text{Pb} = 2,0663$ to $2,0836$. The average values of the coal were measured for $^{207}\text{Pb}/^{206}\text{Pb} = 0,8312$ and $^{208}\text{Pb}/^{206}\text{Pb} = 2,0421$. On the basis of these isotope ratios was found out that during the burning of coal and subsequent galena crystallization from hot gases there is no isotopic fractionation. Mass ^{210}Pb activity in galena ranged from 135 ± 9 Bq/g to 714 ± 22 Bq/g. Radioactivity of galena causes the developement of micro-deformation in the crystal structure. This micro-deformation is demonstrated by increased micro-strain in the crystal lattice. The level of this strain is dependent on the time for which the galena were exposed to radioactivity.