Pollution with arsenic and heavy metals of soils and some components of the food chain in the environment of Goliam Bukovets mine tailings impoundment, Chiprovtsi mining area, NW Bulgaria

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The Chiprovtsi mining area is contaminated as a consequence of past mining. The 20-year existing of Goliam Bukovets mine tailings impoundment has affected all elements of its surroundings. As a result elevated concentrations of arsenic and heavy metals in upper soil layers and in grass are established. The low distributions of arsenic and heavy metals in depth allow assuming their low mobility which restricts their unfavourable environmental impact. The sheep's milk has elevated Zn and Cu contents and so it transfers them to the humans. The carry-over of Pb, Cd and As from grass to the milk is low. Metal concentrations in livestock's excrements are low and seem not to pose risk for secondary soil contamination if used as organic fertilizer. Although the tailings impoundment is almost recultivated and the dust pollution is finished the contaminated soils of the surroundings contain arsenic and heavy metals and continue to transfer them through the food chain. Besides, the soil cover of the impoundment is not sufficient to avoid the penetration of grasses root to the mine tailings.

The effect of montmorillonite modification by Cr(III)-compounds on its microcrystalline structure and electrosurface properties

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Modification of clay minerals by nanoclusters of hydroxycations Cr(III) opens the perspectives for development of a new materials (catalysts, adsorbents, pigment concentrates, leather fillings) and nanocomposites. In order to examine the effect of montmorillonite modification by Cr(III)-compounds with different basicity on its electrosurface properties the dependences of ζ -potential and the stability of MMT dispersions on pH medium and concentration of chromium nitrate have been studied. For pH 2-12, three zones of stability are observed, which alternate with three zones of coagulation. The triple change of MMT charge sign in $Cr(NO_3)_3$ solutions and alternation of stability and coagulation zones of dispersions are explained by hydrolysis, complex formation of Cr^{3+}-ions and ionization of hard phase groups. Charge reversal of MMT surface and appearance of the second zone of stability of positively charged sol are conditioned by excess adsorption) of polymerized cationic species of chromium. The adsorption of polymeric hydroxychromium cations depends upon the basicity of $Cr(NO_3)_3$ solution exceeds the CEC of MMT by 2-5 times. Hydroxychromium-montmorillonite (Hydroxy-Cr-MMT) has high positive charge (tens or hundreds $\mu C/cm^2$) and highly developed accessible specific surface area (95-260 m^2/g). Modification of MMT by hydroxychromium cations was accompanied by increase of the interlayer space along *c-axis* up to d_{001} = 1.68 nm and appearance of highly developed micro- and mesoporous turbo-stratified (disordered) structure.