

Contaminant transport modeling in the candidate VLLW disposal site

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This paper takes advantage of MODFLOW software to simulate the groundwater pollutant(Sr) migration in the candidate VLLW disposal site in the Tea ditch and its nearby living quarters.

Simulation results show that, when the VLLW are dumped in landfills, there's no significantly impact on the environment and the residents living quarters in the south in 200 years. Meanwhile, we also simulate the condition once this disposal site leakage occurs. And this suggests, after the leakage 5 years, Besides pollutant concentration observation Well-3 (OW3) not observed in obvious pollutants, the rest two were observed a evident value of the pollutant concentration, since then, pollutants spread to the whole proluvial fan gradually, there's no doubt that it has a significant influence on the proluvial fan and the resident nearby.

Alteration of arsenopyrite in sulphuric acid

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Arsenic contaminants gives the huge threaten on humanbeings health and life.

A massive arsenopyrite sample was cut into small pieces of cube with the size of about 3 mm to have a reference shape and size when studying the leaching process. The leaching is lasting one month at the temperature of 100, 150, 200, 250 and 300 °C in sulphuric acid with the concentration of 1, 0.1 and 0.001M. The arsenopyrite cube and acid was enclosed in a teflon tube and wrapped with steel vessel. Each cube was measured in size and weight previous and after the leaching process. Then, the cube relicit was cut into sections and was used to carry out morphological observation under both petrographical microscope and Scanned Electron Microscope (SEM), surficial chemical element identification with the use of X-ray Photoelectron Spectroscopy (XPS). And the liquid lechate was tested by ICP-AES.

Results show that the size of cube keeps almost same but the weight decrease with increase of the concentration of sulphuric acid. It suggests that some element was leached out from the arsenopyrite. The majority of arsenic is present in the liquid leachate. The XPS measurement from both surface and profile shows the signal of As disappeared or weakened after the leaching process by XPS, while its signal increased with the increase of etching time when depth profile scan is carried out. The morphological observations gives the fact that the leaching starts from the outmost surface of cube or the edge of cracks, large quantities of pores present in the product area, the boundary of product and arsenopyrite is distinct and sharp, no buffer area is present, and the relicit keeps the shape of cube.

Our study shows that the leaching process of arsenopyrite is controlled by the coupled dissolution-precipitation process. The As ion was leaching out and the new product, most probable arsenic oxide, precipitated on the surface of cube or along the cracks. This may suggest that the contamination of surface water and groundwater from weathering of arsenopyrite or arsenic pyrite or other arsenic mineral is main geological cause, And it will bring the huge threaten to the crops, habitants and long term side-effect to the biosphere.

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