

Название: Leachability of heavy metals from stabilized/solidified mine tailing in Russia

Авторы: Abu Qdais, H (Abu Qdais, Hani); Begday, IV (Begday, Inna Vladimirovna); Shkarlet, KY (Shkarlet, Konstantin Yuryevich); Harin, KV (Harin, Konstantin Viktorovich); Bluzhina, AS (Bluzhina, Anastasia Sergeevna); Likhovid, AA (Likhovid, Andrey Aleksandrovich)

Источник: JOURNAL OF ENGINEERING

RESEARCH Том: 7 Выпуск: 3 Стр.: 62-75 Опубликовано: SEP 2019

Аннотация: Mining activities are usually producing significant volume of solid waste, which is commonly known as tailing. In most of the cases, tailing contains hazardous pollutants like heavy metals that are posing risks for environment and public health. Therefore, proper management of tailing to minimize their risks is of great importance. In this study, the leachability of metals (Cd, Pb, Zn, Ni, Cu, Co, Fe, and Mn) from mine tailings was investigated. The mine tailings used for this study have been accumulated for several years at two abandoned Urupsky and Elbrosky tailing dumps in North Caucasus, Russia. The mineralogical composition and metals concentration in the tailing were determined using X-Ray diffraction (XRD) and chemical extraction analysis. Solidification of the tailing from Urupsky and Elbrosky sites was performed using ordinary Portland cement in a ratio of 1: 3 cement to tailing. The solidified masses were cured in water for different periods of time (0, 14, 21, and 28 days) after which they were subjected to dynamic batch leaching test. Regardless of the initial pH value at the beginning of the leaching test, due to the alkaline nature of cement, the leachate pH has been increased immediately to alkaline range (above 11) for all leachates. The study revealed that immobility percentage (IP) of the metals ranged from as low as 2% for the Manganese in Elbrosky tailing to as high as 95.8% for Cadmium from Urupsky tailing. Despite this, all heavy metals concentrations in the leachate generated at the end of curing period of 28 days were either complying with Russian or USEPA Standards for fresh surface water. This indicates that solidification of tailing using cement is an efficient technology for decreasing the mobility of the studied heavy metals from both tailing sites.

Идентификационный номер: WOS:000479141200005

ISSN: 2307-1877

eISSN: 2307-1885