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Uranium isotopes concentration and transport in the Laguna del Cuervo, Chihuahua, Mexico.

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Abstract

In Chihuahua, an important source of environmental radioactivity is found in the Sierra Peña Blanca, in the center of the state. The site has about 70% of uranium reserves in Mexico. The uranium of Peña Blanca was exploited in the 80's. Due to the closure of operations, the extracted and unprocessed ore (hundreds of tons) was confined to rocky stacks, exposed to weathering. Subject to leaching, this uranium is transported from the mountains to Laguna del Cuervo. The mineral exposed in the repository and the uranium transport by water and recent sediments must be studied, to assess the effects on the environment, with radiometric and materials science techniques in conventional laboratories and synchrotron light. This work presents the study of sediment and pore water samples at various points along the lagoon, and the values of the activity ratio of the $^{234}\text{U}/^{238}\text{U}$ isotopes and the sediment-water distribution coefficient of these isotopes, obtained by applying uranium liquid scintillation alpha spectrometry, gamma-ray spectrometry, scanning electron microscopy and X-ray diffraction methods.

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