Experimental on the Electrokinetic Remediation of Pb(II) Contaminated Loess

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Pb(II) accumulates in the human body through the food chain or drinking water and thus causes damage to the nervous, hematological, gastrointestinal, cardiovascular, and renal systems. To effectively suppress the spread of Pb(II) contamination, electrokinetic remediation (ER) tests were conducted on Pb(II)-contaminated loess, and the distribution laws of current (I), potential (U), pH, Pb(II) concentration (C), removal efficiency (R), and energy consumption (E) during ER process were analyzed. The results revealed that the irregular laws of I and U over time and a significantly larger range of I change in the flow-plastic than in the hard-plastic state. When electrolyte was added to the cathode, the pH value in the soil gradually decreased from the cathode area to the anode area and was distributed between 3 and 6. In the meantime, the Pb(II) R reached a maximum of 93.84% and a minimum of 4.29%. The application of ER method resulted in a larger Pb(II) R and lower average E , suggesting that adding a electrolyte to the cathode, preacidizing treatment, and stirring soil at a fixed interval can significantly improved the remediation efficiency of Pb(II) contaminated loess.

Keywords: Electrokinetic remediation; Pb(II); loess; removal efficiency; energy consumption

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