Short Communication

Effect of Soil Density and Electrode Material on the Electrokinetic Removal of Pb(II) from Contaminated Silt Soil

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With the increase in industrial Pb-containing products, Pb pollution is gradually accumulating in the soil, leading to the degradation of soil quality and damage to human health. To find an efficient and environmental method for the remediation of Pb-contaminated silt soil, electrokinetic remediation (ER) was carried out with different soil densities and electrode materials, and the variation laws of the current (I), potential (U), pH, removal efficiency (R), and energy consumption (E) during the ER process were investigated. The results showed that as the ER time (t) increased, I showed a trend of increasing-decreasing-increasing, while U showed a trend of decreasing-increasing-decreasing. Soil density had a great effect on the soil pH, while the electrode material had a great impact on the catholyte pH. Both Pb(II) R and E decreased with increasing soil density. The maximum Pb(II) R reached 98.13% with a unit E of 1.34 W·h/mg. The Pb(II) R obtained with different electrode materials followed the order of ruthenium-iridium coated titanium mesh>rhodium-iridium coated titanium mesh>ruthenium-iridium coated titanium plate, indicating that the electrode of ruthenium-iridium coated titanium mesh had the best removal effect in the ER of the Pb(II)-contaminated silt soil. The research results can provide a reference for ER projects in Pb(II)-contaminated silt soil areas.

Keywords: Electrokinetic remediation; silt soil; density; electrode; removal efficiency

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