Electrokinetic Bioremediation of a Laboratory-prepared Pentadecane-contaminated Kaolinite

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Abstract

Electrokinetic (EK) bioremediation of a laboratory-prepared pentadecane-contaminated kaolinite was carried out according to current and contaminant concentration. Extraneous bacteria and ionic nutrients were continuously supplied to the soil specimen by a new electrolyte circulation method, which controlled electrical pH change of electrolyte solution to keep bacterial activity. During the EK bioremediation the anode region showed the relatively high colony forming unit (CFU) due to electrical attraction between anode and bacteria. Simultaneous increases of CFU and pentadecane removal in most soil regions were observed. The removal efficiencies for 2,000 and 5,000 mg/kg pentadecane at 0.63 mA/cm^2 were 28.7 and 16.8%, respectively after 14 days. The removal amount of pentadecane increased with initial pentadecane concentration because of the increased amount of weakly-bound pentadecane onto the soil surface. The removal efficiency (19.3%) at 1.88 mA/cm^2 was lower than at 0.63 mA/cm^2 (28.7%). It is presumably because the higher current density reduced the residence time of the electrically-transported bacteria in the soil specimen.

References

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