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DECONTAMINATION OF DIESEL-POLLUTED SOIL THROUGH FLOTATION

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Abstract

This paper studies, in lab scale, the possibility of removing a rich-in-pollutant soil fraction using flotation, with the clean fraction been restored to its natural condition. The tests were carried out in a conventional flotation cell with mechanical agitation. Artificially polluted soil was used throughout this study by mixing soil with diesel fuel. The effect of the following flotation factors was studied: pulp pH, collector type and quantity, conditioning and flotation time, initial soil content in pollutant, and scavenging stages. It was found that a soil fraction rich-in-pollutant was removed to the froth while a comparatively cleaner fraction was recovered in the tailings. In several cases, the removal of diesel-polluted particles approaches or reaches 100%. Between the collectors used, sodium dodecylsulfate (SDS) proved more efficient than amine. The results are slightly affected by pH when amine is used, while the effect is more intensive when SDS is used, especially in the basic region. Also, both collector dose and initial soil content in pollutant play a significant role in the removal of the polluted soil particles to the froth. The increase of either conditioning or flotation time influences the process positively. In addition, the results are improved by submitting the non-float product to scavenging flotation. Finally, the physical chemistry of the system and the experimental findings suggest that a strong hydrophobic structure is responsible for the concentration of diesel-polluted soil particles into the froth. This structure was produced by the synergistic effect of diesel-oil with the surfactant ions (SDS or amine).

Key words: diesel-polluted soil, hydrocarbon-polluted soil, organic pollutants, soil decontamination, soil flotation, soil washing

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