'99 춘계학술발표회 논문집
한국원자력학회

현장적용을 위한 코발트 오염토양 제염 특성 분석

An Analysis on Remediation Characteristics of Soils Contaminated with Co for In-Situ Application

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요 약

오염토양을 제염하기 위한 Solvent Flushing 장치를 제작했다. 핵시설주변 토양을 샘플링하여 코발트용액으로 강제오염시킨 후, Solvent Flushing방법에 의한 제염특성을 분석했다. 한편, Solvent Flushing에 의한 토양제염을 모델링하기 위한 비평형흡착코드를 개발하고, 모델링을 위해 필요한 입력파라미터를 실험실에서 측정했다. 실험결과는 다음과 같다 : 핵시설 주변 토양은 많은 실트와 모래를 포함한 Silt Loam에 속한다. 물을 이용하여 제염할 때 수리전도도가 클수록 토양 제염효율은 높았다. 비평형흡착코드로 계산한 값은 평형흡착코드로 계산한 값보다 좀더 실험값과 일치했다. Citric Acid를 Solvent로 사용할 때, 물보다 약 1.65 배의 제염효과를 나타냈다.

ABSTRACT

The solvent flushing apparatus for in-situ soil remediation was designed. After the soil around nuclear facilities was sampled and compulsorily contaminated by Co solution, the remediation characteristics by solvent flushing were analyzed. Meanwhile, the nonequilibrium sorption code was developed for modelling of the soil remediation by solvent flushing, and input parameters needed for modelling were measured by laboratory experiment. Experimental results are as follows : The soil around nuclear facilities belongs to Silt Loam including a lot of silt and sand. When water was used as a solvent, the higher was the hydraulic conductivity, the higher the efficiency of soil remediation was. The values calculated by the nonequilibrium sorption code agreed with experimental values more exactly than the values calculated by the equilibrium sorption code. When citric acid was used as a solvent, the soil remediation efficiency by citric acid showed 1.65 times that by water.