

化学

水泥固化Cs、U(VI)的浸出模型研究

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摘要 采用碱矿渣-粘土复合胶凝材料(AASCM)和普通硅酸盐水泥(OPC)固化模拟放射性泥浆, 对固化体中Cs⁺、U(VI)的浸出性能进行了研究。根据Fick第二定律建立并优化了预测核素浸出行为的二维衰变浸出模型。通过MATLAB软件编程计算, 以非恒定表观扩散系数的二维衰变模型对Cs⁺、U(VI)的浸出行为进行了预测。结果表明: AASCM固化Cs⁺、U(VI)的能力大于OPC, 浸出28 d后, AASCM中Cs⁺、U(VI)的累积浸出分数分别低于OPC的1/5和1/2; Cs⁺、U(VI)浸出的表观扩散系数呈衰减趋势, 当考虑表观扩散系数衰减时, 二维衰变浸出模型对OPC固化Cs⁺、U(VI)及AASCM固化U(VI)的浸出行为预测较好, 但对离子交换吸附作用较强的AASCM固化体中Cs⁺浸出行为预测较差。

关键词 [水泥固化体](#) [浸出行为](#) [扩散](#) [浸出模型](#)

分类号

Leaching Model of Cs, U(VI) Immobilized in Cement

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Abstract Alkali-activated slag-clay minerals composite cement (AASCM) and ordinary portland cement (OPC) were used to immobilize the simulated radioactive slurry. The leachabilities of Cs⁺, U(VI) were studied. A two-dimension decay leaching model (T-DLM) applied to predict the leaching behavior of radionuclides was established and optimized, according to Fick's second law. The leaching behaviors of Cs⁺, U(VI) were predicted by the T-DLM with non-constant apparent diffusion coefficient, via programmed calculation with MATLAB software. The results indicate that the capacity of AASCM immobilizing Cs⁺, U(VI) is better than OPC. The cumulative leaching fractions of Cs⁺, from AASCM are less than 1/5 and 1/2 of that from OPC, separately, after leaching for 28 d. The apparent diffusion coefficients of Cs⁺, U(VI) register as the attenuation trend. While considering the attenuation of apparent diffusion coefficient, the leaching behaviors of Cs⁺, U(VI) immobilized in OPC and U(VI) immobilized in AASCM can be predicted well by the T-DLM, but the leaching behavior of Cs⁺ immobilized in AASCM which has stronger ion-exchange and adsorption capacity can not be predicted well.

Key words [cement-solidified](#) [waste](#) [form](#) [leaching](#) [behavior](#) [diffusion](#) [leaching](#) [model](#)

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