

化学

铀尾矿库区浅层地下水中U(VI)迁移的模拟

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摘要 在详细分析中国南部某大型铀水冶尾矿库的结构特点、运营情况和库区水文地质条件的基础上, 对库区水文地质条件进行概述, 运用溶质反应-运移模拟软件PHREEQC- II, 建立研究区U(VI)在浅层地下水中的迁移的一维溶质反应-输运耦合模型, 并分析在不同时间、距离、扩散系数、弥散度等条件下铀在铀尾矿库区浅层地下水中的迁移, 即铀浓度随时间及距离的变化。模拟结果与现场观测资料基本吻合, 表明该软件能较好地模拟U(VI)的迁移情况, 证明了该模型的可行性。研究还表明, 弥散作用对铀迁移有显著影响, 弥散度的取值是模拟可靠与否的关键参数, 而分子扩散对本模拟的影响可忽略不计。

关键词 [PHREEQC- II 程序](#) [核素迁移](#) [溶质反应-输运耦合模拟](#) [铀水冶](#)

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Simulation of U (VI) Migration in Shallow Groundwater at Uranium Mill-Tailing Site

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Abstract Based on the analyses of the structure characteristics, running and hydrogeological conditions of the uranium mill-tailing site in southern China, the geological and hydrogeological conditions were summarized. Then the one-dimension coupled solute reaction-transport numerical model was employed to simulate the U(VI) migration in shallow groundwater at the site studied here using PHREEQC- II code. The U(VI) concentration distribution as a function of time and distance was calculated and analysed with various diffusing coefficients and dispersion coefficients. The results show that PHREEQC- II code can successfully simulate the U(VI) migration in shallow groundwater of site studied here. The effect of dispersion on the U(VI) migration in shallow groundwater is significant, while the molecule diffusion can be ignored in this model. Therefore, the dispersion coefficient is a key parameter in this modelling.

Key words [PHREEQC- II code](#) [radionuclide migration](#) [coupled solute reaction transport simulation](#) [uranium mill-tailing site](#)

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