

放射性废物处置研究进展

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中文摘要: 放射性废物的处置是制约核能可持续发展的关键因素, 目前已成为国际社会关注的热点问题之一。针对处置场地核素运移污染的风险问题, 对放射性废物的处置及其选址、核素运移试验和核素运移模型进行了回顾和论述。指出采用多重屏障系统进行放射性废物的处置, 其安全性是可以得到保障的; 处置场的选址应遵循就近原则, 应从环境水文地质学的角度来构建场地的选址及评价体系; 核素运移试验应注重室内试验和原位试验相结合, 以保证所得结果和参数的可靠性; 核素运移模型研究经历了由对流-弥散模型→Kd模型→多组分反应性模型的发展阶段, 并取得了重要进展, 但在处理非均质介质和非均质反应、矿物溶解-沉淀与水动力行为的相互影响以及稳定性和实际应用能力等方面还亟待提高。我国放射性废物的处置与研究较为滞后, 需在处置场选址规范体系、核素运移试验以及模拟技术等方面取得突破和提高。

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Advances in Research on Disposal of Radioactive Waste

Abstract: Disposal of radioactive wastes (DRW) will eventually hinder the sustainable development of nuclear energy. Safety DRW has become an issue that receives worldwide attentions. Aimed at tackling the exposure risk of radioactive waste transport in the groundwater system of disposal sites, this paper presents a review on DRW along with site selection, radionuclide transport experiments and numerical models. Safety of DRW can be achieved by disposal of radioactive wastes with a multi-barrier system. A disposal site should be located at an area near the place where the wastes are produced. The site investigation and assessment system should focus on aspects of environmental hydrogeology. Both lab and in-situ test should be considered for obtaining correct results and parameters for the transport of radionuclides in a groundwater system. Numerical models for radionuclides transport have made great progress through advection-dispersion and linear sorption (Kd) to multi-component reactive transport models. However, the numerical methods need improvement in dealing with heterogeneous media and chemical reactions, interactions between mineral dissolution/precipitation and hydrodynamic process, model validity as well as the capability of application to real cases. DRW in China has been relatively poorly studied and work needs to be improved in such aspects as site selection standard series, experimental techniques and modeling approaches.


keywords: [disposal of radioactive waste](#) [hydrogeology](#) [assessment of environment affects](#) [radionuclide transport experiments](#) [radionuclide transport models](#)

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