

铀随地下水迁移的地球化学屏障物料选择

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摘要 通过热力学计算得到的铀在场址地下水中的主要存在形态为 $\text{UO}_2(\text{CO}_3)^{2-}_2$ 、 $\text{UO}_2(\text{CO}_3)^{4-}_3$ 、 UO_2CO^0_3 、 $\text{UO}_2(\text{HPO}_4)^{2-}_2$, 它们占99%以上。本工作对4种场址土壤进行表面电荷及 K_d 值测定。测定结果表明: 场址III土壤有最大的表面正电荷值, 且对铀有极高的吸附比, 是铀的良好吸附屏障物料。采用测定 K_d 的方法研究了8种添加剂对4种场址土壤以及炭质砂岩、 $\text{Ca}(\text{OH})_2$ 对III号土壤的改良作用。结果表明: 大部分添加剂未对铀产生屏障作用; 炭质砂岩、 $\text{Ca}(\text{OH})_2$ 改善了III号土壤的吸附性能, 且 $\text{Ca}(\text{OH})_2$ 是比炭质砂岩更为优越的添加剂。

关键词 [铀](#) [热力学计算](#) [添加剂](#) [地球化学工程屏障](#)

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Selection of Geochemical Engineering Barrier Material for Uranium Migration With Groundwater

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Abstract The selection research of geochemical engineering barrier material for the buried disposal of very low level radioactive waste containing uranium was performed. The thermodynamics calculation results indicate that the overwhelming majority (more than 99%) of U(VI) in the groundwater exit as the complex species, such as $\text{UO}_2(\text{CO}_3)^{2-}_2$, $\text{UO}_2(\text{CO}_3)^{4-}_3$, UO_2CO^0_3 and $\text{UO}_2(\text{HPO}_4)^{2-}_2$. Surface electric charge of the four samples was measured, and the result shows that the soil sample III has the highest positive charge value among the investigated soil samples, and it is high K_d value. The experiment of additive selection was performed through measuring the sorption rate. There are eight additives and four kinds of basic material in our experiment. The results show that the most of investigated additives can not remarkably improve the adsorption performance of the soil for uranium, but the additive of charry gritstone and $\text{Ca}(\text{OH})_2$ have great effect on the improving sorption rate. The effect of $\text{Ca}(\text{OH})_2$ is better than charry gritstone.

Key words [uranium](#) [thermodynamics](#) [calculation](#) [additives](#) [geochemical](#) [barrier](#)

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