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Application of Non-linear Heterogeneity-based Isotherm Models for Charactering Sorption of Cs and Se on Mudrocks

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It plays a very important role for characterizing sorption behaviors of cesium (Cs) and selenium (Se) on Taiwanese mudrocks to retard the migration of radionuclides from a radioactive waste repository. In this study, two non-linear heterogeneity-based isotherms, Langmuir-Freundlich model (LF) and generalized-Freundlich model (GF), were applied for the evaluation of the sorption characteristics of Cs and Se on Taiwanese mudrocks. The batch sorption experiments were carried out and the experimental data were simulated by LF and GF heterogeneity-based isotherm models. In addition, the results showed that both of the LF and GF models could fit the experimental data more perfectly than the Langmuir one. The heterogeneity of sorption behaviors for Cs and Se could be well characterized by the LF and GF models from the root mean square error (RMSE) calculation and plot of the affinity spectrum. The results demonstrated that the sorption mechanism of Cs and Se on mudrock is quite different and Cs sorption is more heterogeneous and complicated than that in Se.

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