

Selenite and Strontium breakthrough in a column of goethite coated sand: experiments and modelling

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A previously proposed CD-MUSIC type approach for Se and Sr adsorption on goethite derived from a wide range of uptake data backed up by X-ray absorption spectroscopic results was used to model corresponding migration experiments. The goethite used in the batch-study was coated to a sand and columns were prepared for migration experiments. First simulations of the migration experiments with selenite and strontium showed that it is necessary to add reactions involving a silica type surface (representing the part of the sand surface not coated by goethite) to obtain a good fit to the experimental data both for binary (Se/goethite) and ternary (Se/Sr/goethite) systems. The reactions on the silica-type surface impact the pH front, and thus indirectly the selenite breakthrough. The role of the silica is also corroborated by streaming potential data on the goethite coated sand, which revealed a net decrease of the point of zero charge of the coated sand relative to the point of zero charge of the bare goethite.