ABSTRACT FORM

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Analysis of breakthrough curves of Np(V) in clayey sand packed column. in terms of mass transfer kinetics.

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The transport properties of Np(V) in a column packed with a mixture of silica sand and natural clay minerals ((8%), essentially montmorillonite and kaolinite with goethite (6.5%)) were studied. The clayey sand packing is 1.6 cm in diameter and 8 cm in length; the pore velocity varies from 0.36 to 3.6 m/day. Np(V) is injected as a concentration pulse of 8. 10^{-6}mole/l in a solution containing sodium **per**chlorate **(0**and sodium carbonate at a given pH. Np(V) is detected at the outlet and the K_D is measured from the first moment of the breakthrough curves which depends on the **sorption and chemical** equilibrium properties only. The curve log(K_D) vs pH displays a characteristic shape. Log(K_D) firstly decreaces from 1.5 at pH 8.2 to 0.5 at pH 9.8, value for which a minimum is observed. Then, when pH increases to 11.8, log(K_D) value increases to 1.3.

The theorical interpretation of **the** equilibrium properties as a function of pH is given elsewhere. This presentation is devoted to the interpretation and the modelling of breakthrough curves shape which presents a characteristic evolution as a function of pH : **The stronger** the retention is, **the higher** the reduced variance of Np(V) peaks **is ~~are~~**. The analysis of this behavior from the linear chromatograpy theory, leads to attribute it to external and/or internal mass transfer limitations. Introducing the external and internal characteristic times of first order kinetics interactions allows us to determine the nature of mass transfer kinetics, the characteristic length of clayey sand aggregates and to evaluate the effective diffusion coefficient of Np in clays mixture.