

# MULTICOMPONENT ION EXCHANGE DYNAMICS WITH EQUILIBRIA DESCRIBED BY SURFACE COMPLEXATION THEORY

A I Kalinichev<sup>1\*</sup> and W H Höll<sup>2</sup>

<sup>1</sup>*Institute of Phys. Chem., Russian Acad. of Sci., Leninskyi Prospect 31, 119991, Moscow, Russia.*

<sup>2</sup>*Karlsruhe Research Center, Institute of Techn. Chem., Section WGT, P.O. Box 3640, D-76021 Karlsruhe, Germany.*

## ABSTRACT

The surface complex formation (*SCF*) theory for the description of multicomponent equilibria has been introduced into nonlinear system of dynamic and kinetic mass balance differential equations. The numerical iterative methods for the calculation of the resulting dynamic behaviour of the ion exchange (IEx) systems have been elaborated.

A number of computer simulations have been made for various ion exchange systems including variants of complex forming (CF) reactions in the moving phase of ion exchange columns. Experimental values for the *SCF*-parameters  $\{K_{s+1}^s; m(s,s+1)\}$  have been used during the numerical calculations for various ion exchange resins.

As a result the calculated concentration distributions for ionic components in various multicomponent frontal displacement chromatograms have been obtained and presented. The displacement effects including inversion of the ionic components in the chromatograms have been considered.