ABSTRACTS

14: Tófalvi, R.; Horváth, K.; Hajós, P.: High Performance Ion Chromatography of Transition Metal Chelate Complexes and Aminopolycarboxylate Ligands. *J. Chromatogr. A* 1272 (2013) 26-32.

A simple ion chromatographic method was developed for the separation of transition metal chelates (CuEDTA, CuDCTA, ZnEDTA, ZnDCTA) and free anionic complexing ligands (EDTA, DCTA) using alkaline carbonate eluents and conductivity detection. The complex equilibria and kinetic process of separations were studied in order to understand major factors in the control of selectivity and retention order of complex anions. A systematic study was applied to identify the additional peaks of the system as $NaEDTA^{3-}$, $NaHEDTA^{2-}$, $Na2EDTA^{2-}$, $EDTA^{4-}$/$HEDTA^{3-}$, $DCTA^{4-}$/$HDCTA^{-3}$. On the basis of microequilibrium considerations of chelating ligand, it was shown that one should expect the peaks of sodium chelates when the ligand is in excess in the sample solution. The probability density function was introduced for calculation of complex chromatograms, because complexing ligands can exist in at least two different interconvertible forms in the presence of metal ion. The chromatogram of interconverting chelate species can be given as the sum of probability density functions (P) weighed by the molar fractions of complexed (fiML) and dissociated (fiL) forms. The influences of kinetic rate of complex formation and dissociation on the distribution of components between eluents and ion exchange stationary phases were quantitatively described and demonstrated by elution profiles. The applicability of the developed method is represented by the simultaneous analysis of transition metal chelates and inorganic anions. ICP-AES analysis and FTIR-ATR technique were used for confirmation of IC results for metals and ligands, respectively. Collection protocols for the heart-cutting procedure of chromatograms were applied in the analysis of target components. The limit of detection and linearity of the method in the range of 0.01–0.25 mM sample concentration were also presented.