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Evaluation of a flow-through dialysis probe for sampling and sample preparation: Hyphenation to ion chromatography

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Abstract

A commercially available dialysis probe has, for the first time, been evaluated for sampling and sample preparation in combination with ion chromatography (IC). In operation the probe is immersed into the sample solution and a receiver liquid is propelled through the probe behind a suitable dialysis membrane. Small inorganic anions (fluoride, chloride, nitrite, bromide, nitrate, sulfate, phosphate) are transferred across the membrane into the receiver liquid and carried towards the injection valve of the IC system. Two different modes of operation, i.e. constantly flowing receiver liquid and a temporarily halted receiver liquid have been investigated. The influence of different parameters affecting the recovery of ions with respect to the initial concentration in the sample solutions was examined. These parameters were the flow rate of the receiver liquid, the hydrodynamic conditions in the sample solution, the kind of dialysis membrane and the chemical composition of the sample solution. Under dynamic dialysis conditions with constantly flowing receiver liquid the recoveries for different ions differ and - even under optimized experimental conditions - remain far away from concentration equilibrium between sample solution and receiver liquid. As a consequence of the different transfer rates Donnan potential effects occur in the presence of

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