150 ANOS PARA 118 ELEMENTOS
A TABELA PERIÓDICA

XXVI ENCONTRO NACIONAL

DA SOCIEDADE PORTUGUESA DE QUÍMICA

24, 25 E 26 DE JULHO DE 2019
FACULDADE DE CIÊNCIAS DA UNIVERSIDADE DO PORTO

2019
IYPT

ANO INTERNACIONAL
DA TABELA PERIÓDICA

SPQ

U. PORTO
FC FACULDADE DE CIÊNCIAS
UNIVERSIDADE DO PORTO

Environment

Biparametric sequential injection system with on-line solid phase extraction for the determination of copper and zinc in waters

Tânia C. F. Ribas[a], Charles F. Croft[b], M. Inês G. S. Almeida[b], Raquel B. R. Mesquita[a], Spas D. Kolev[b], António O. S. S. Rangel[a]

a) Universidade Católica Portuguesa, CBQF - Centro de Biotecnologia e Química Fina – Laboratório Associado, Escola Superior de Biotecnologia, 4169-005 Porto, Portugal; b) School of Chemistry, The University of Melbourne, VIC, 3010, Australia.

Email: arangel@porto.ucp.pt

Solid phase extraction (SPE) is a technique widely used for sample pre-treatment in analytical chemistry. SPE allows for selective analyte separation from complex matrix interferences. Under certain conditions, SPE can also be a strategy for pre-concentration of a specific analyte present in low concentrations. In this scenario, a biparametric sequential injection system using SPE for the separation of copper and zinc followed by their individual spectrophotometric determination was developed (**Figure 1**).

To conduct all determinations using a single manifold, a non-selective reagent, 4-(2-pyridylazo) resorcinol (PAR), was chosen as the colour reagent. SPE using two different sorbent materials was the chosen strategy to selectively separate and allow the determination of the individual metal ions. Materials used for the copper and zinc ion retention were Chelex 100 and a PVC-based polymer inclusion membrane (PIM), respectively.

Chelex 100 resin is a styrene divinylbenzene copolymer, which acts as a chelating resin. It is usually used to bind metal ions, and the metal affinity depends on the solution pH. PIMs are thin, flexible and stable polymeric films that can selectively retain chemical species and, when functionalized with di-(2-ethylhexyl)phosphoric acid (D2EHPA), presents high affinity for zinc.[1] The use of the mentioned sorbents was explored to separate the two metal ions.
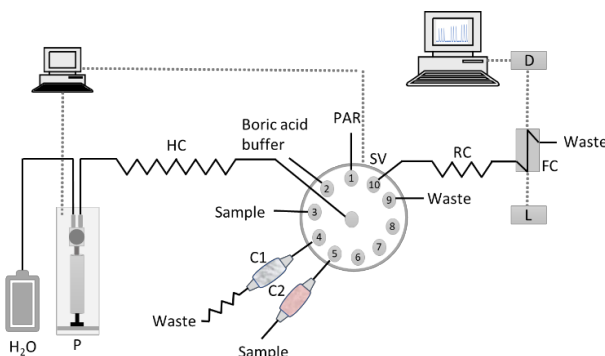

Figure 1: Biparametric sequential injection manifold for Cu and Zn determination. C1 – PIM column; C2 – Chelex 100 column; P – Syringe pump; HC – Holding coil; SV – Selection valve; RC – Reaction coil; L – Light source; FC – Flow cell; D – Spectrophotometer.

References:
1. Nghiem L. D., Mornane P., Potter I. D., Perera J. M., Cattrall R. W., Kolev S. D., J. Membr. Sci. **2006**, 281, 7.