Using of Conducting Polymers in Simultaneous Solid-Phase Microextraction of Anions and Cations

Betül Usta, Yücel Şahin, and Mutlu Şahin
Anadolu University, Faculty of Science, Department of Chemistry, 26470 Eskişehir, Turkey
betule@anadolu.edu.tr

Solid phase extraction is a well established technique which combines sample clean up and preconcentration in one step. In applying this technique commercial thin polymer film coated on a silica fiber are used as an extraction phase. However, the neutral charge of commercially available SPE coatings results in a low coating/sample partition coefficient and poor analyte recoveries, which limited its application. The most promising alternative for the extraction of ionic compounds is the use of conducting polymers. Among other polymers PPy and its derivatives, have attracted great interest in the development of electrochemically controlled solid phase extraction as ion exchange material for charged species because of doping/undoping features. Using conducting polymer as an extraction material has advantage because charge of coating can easily be controlled oxidation and reduction of the polymers. PPy with small counter ions mainly exhibits anion-exchanger behavior and overoxidized polypyrrole films exhibits cation exchanger behavior. [1-3]

In this study polypyrrole and overoxidized sulfonated polypyrrole films are used as an extracting material for in situ extraction of anions and cations. Uptake and release properties of polymers towards anions and cations were examined under controlled potential. PPy film used as an anode and overoxidized sulfonated polypyrrole film used as a cathode material and reverse order of the electrodes were investigated. Both of this two cell arrangements compared and extracted amounts of ions which are then desorbed in sample aliquot were determined by ion chromatography.

References