

## Sorbent extraction optosensing (SEOS) – A novel field applicable screening technique for trace ion analysis

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A general means to increase sensitivity of chemical assays is the application of a preconcentration procedure. This in many instances also leads to selectivity improvement through matrix removal. Solid phase extraction, typically used for sample clean-up in chromatography, due to its inherent features has attracted considerable attention also for the preconcentration of trace elements [1,2]. The common procedures involve (i) sorptive preconcentration of the target analyte itself or a derivative of the analyte formed in a preceding reaction, (ii) elution from the sorbent by suitable solvent and (iii) determination of the analyte in the eluent.

Several years ago, we have proposed a novel method relying on species selective sorptive preconcentration on so-called extraction membranes with direct (*in-situ*) optical detection of the sorbed compounds [3,4]. In the lecture we will recall the fundamentals of this conceptually widely applicable method and present some newer instrumental configurations for optical sensing of the sorbed species. Principle considerations concerning the selection of appropriate sorbent materials, conditioning of the sorbent, choice of derivatisation reagent and the operational parameters (i.e. sample loading volume and flow rate) will be outlined. Applications presented include trace metal ion determinations (and if applicable also metal speciation) of chromium, iron, aluminium, arsenic but also the speciation of non-metals like phosphorous, nitrogen and sulphur with respect to different oxidation states.

Results of analysis of real samples, mainly of environmental origin, will also be presented along with a thorough discussion of problems and limitations encountered.

- 1) C. Kantipuly, S. Katragadda, A. Chow, H.D. Gesser, Chelating Polymers and related supports for separation and preconcentration of trace metals, *Talanta*, 37 (1990) 491
- 2) Y.A. Zolotov, N.M. Kuz'min, Preconcentration of Trace Elements, in: Wilson and Wilson's *Comprehensive Analytical Chemistry*, Vol. XXV, Elsevier, Amsterdam, 1990
- 3) W. Frenzel, Highly sensitive semi-quantitative field test for the determination of chromium(VI) in aqueous samples, *Fresenius J. Anal. Chem.*, 361 (1998) 774
- 4) W. Frenzel, N. Dantan, Screening method for the determination of orthophosphates at microgram concentration levels, *Chem. Anal. (Warsaw)*, 44 (1999) 539