

## **Spray Chamber Optimization for the Coupling of CE to ICP-MS**

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In analytical chemistry, speciation analysis has steadily gained more importance in recent years. This is mainly due to the fact that relevant information about a sample, e.g. toxicity, degree of contamination etc., can only be obtained if individual species of one element are determined. The coupling of inductively coupled plasma mass spectrometry (ICP-MS) with separation systems such as liquid chromatography (LC), gas chromatography (GC) or capillary electrophoresis (CE) allows both the selective and sensitive analysis of element species.

In 1995, Olesik et al. [1] reported on the first interface for the coupling of CE to ICP-MS. However, the applicability of this interface was only limited as the pneumatic nebulizer dealt with a laminar flow. In order to overcome this limitation, another nebulizer has been developed by Prange et al. in 1998 [2]. Currently, two nebulizer systems are commercially available: a concentric nebulizer from Cetac, and a parallel-path nebulizer from Brugener Mira.

In this work, the parallel-path nebulizer has been used in combination with different spray-chamber designs, all of which are home-made. We used an micro cyclone spray chamber and axially spray chambers optionally with an tangential gas flow. The spray chambers have been investigated and optimized regarding nebulizer-gas pressures, flow rates and sheath-flow influences. For the characterization of each spray chamber, we show the  $Mg^+$ ,  $Pb^+$ ,  $In^+$ ,  $[CeO]^+$ , and  $Ce^{2+}$  signal traces. Furthermore, the separation of cobaltocinium salts by CE coupled to ICP-MS with an optimized interface design has been investigated.

To compare the results obtained with the home-made spray chambers, a commercially available spray chamber has been used in combination with the concentric nebulizer from Cetac

### References:

- [1] B. Michalke, *Electrophoresis*, 26 (2005) 1584-1597.
- [2] A. Prange, D. Schaumlöffel, D. Vorrichtung zur Kopplung einer Kapillarelektro-phoreseeinrichtung mit einer Plasma-Massen-Spektrometereinrichtung, Patent No. DE19841288C2, Publication Date 1998, September 09.