

CE-DAD-ICP-MS as tool for investigation in the complexation of metals and for metal speciation

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The technique of CE-ICP-MS (1) was enhanced during the recent years by a diode array detector DAD to give the opportunity to determine metal ion species as well as complexes and free ligands. The big advantage is that these three types of analytes can be separated and detected in one run.

The performance of this technique has been improved and the new developments show an optimised sample introduction system to lower the limits of detection. It is now possible to introduce 100% of the sample uptake into the plasma. It is now possible to determine metal species with 1 ppb and humic acid as an interesting ligand with a limit of detection of 20 mg/l. By the use of the complete spectra of the diode array detector it is possible to assign the determined species. Different examples will be gives that show the prospects.

The technique was also applied to determine complex formation constants. This will at the example of Ho and iodine marked humic acid (figure 1).

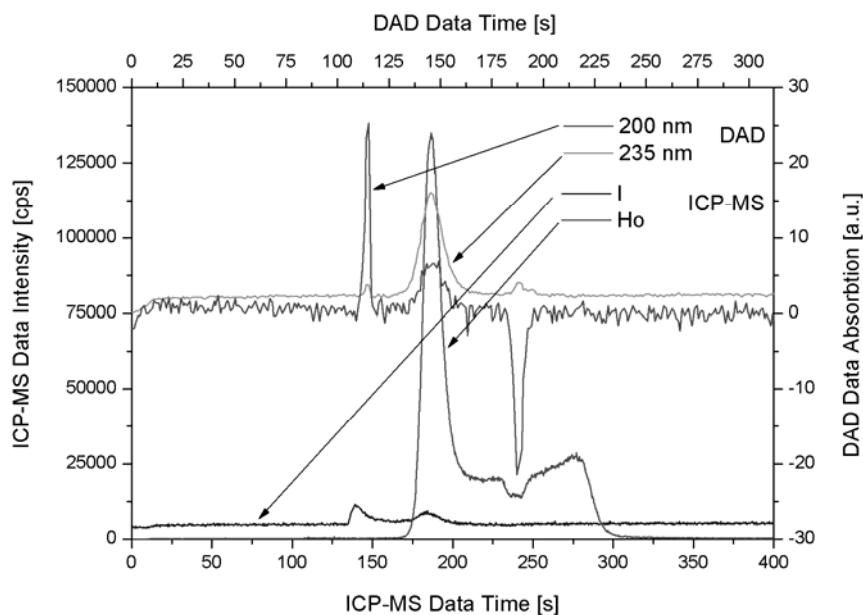


Figure 1: Electropherogram obtained by DAD and ICP-MS detection from a solution containing iodine marked humic acid and Ho

- (1) B. Kuczewski, C.M. Marquardt, A. Seibert, H. Geckeis, J.V. Kratz, N. Trautmann, Separation of Plutonium and Neptunium Species by Capillary Electrophoresis-Inductively Coupled Plasma Mass Spectrometry and Application to Natural Groundwater Samples, *Anal. Chem.*, 75 (2003) 6769 – 6774.