

50 years of research in AAS – And now...?

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I started my work with Atomic Absorption Spectrometry (AAS) in January 1967, and I was actually not very excited with the technique. However, in September of the same year, I got a chance to participate in the First Atomic Absorption Symposium in Prague, at that time Czechoslovakia. I could meet with Sir Alan Walsh from Australia, the founder of modern AAS, and Boris V. L'vov from Russia, who had proposed a graphite furnace (GF) as an atomizer for AAS instead of the conventionally used flame. I was fascinated by the idea and pushed the development of a commercial GF at Bodenseewerk Perkin Elmer, which resulted in the introduction of the HGA 70 in 1970. There were still a lot of difficulties at the beginning, and it took a lot more research to understand the GF and to use it properly. Atomization from a graphite platform instead from the tube wall, and transversely heated graphite tubes were developed in the frame of the 'Stabilized Temperature Platform Furnace' concept, proposed by Walter Slavin. Step by step the GF became a rugged tool that could be used routinely for trace element determination in a great variety of matrices.

The use of an individual source lamp for each element to be determined was an essential part of the AAS concept proposed by Alan Walsh in the 1950s; however, the first proposals for using continuum radiation sources for AAS appeared already in the 1960s. In spite of an ongoing research in that field, particularly in the USA, the idea never found greater interest, particularly not from instrument manufacturers. This changed only after Becker-Ross and colleagues introduced a completely new concept for high-resolution continuum source AAS (HR-CS AAS) in 1996. Soon after we started to work on the concept in our Department of Applied Research, and I was convinced that this is the future of AAS. However, the new owners of Perkin-Elmer did not like the idea; they sent me to early retirement in 1998, closed down my department, and soon after the entire factory in Germany. I obviously had no plans to retire, and accepted an offer to work as a visiting professor at the Federal University of Santa Catarina, Brazil. But before leaving Germany in 1999, I visited Analytik Jena, at that time a young and emerging company, and made them aware of the situation with the HR-CS AAS project, which will be abandoned soon. I could convince them to embark on this project and offered my cooperation. In 2002 I received one of the first prototypes of a HR-CS AAS instrument, built at ISAS, Berlin, on the basis of equipment from Analytik Jena. We had the opportunity to explore all the advantages of the new concept, the better limits of detection, the extended working range, the far superior background correction systems, the (yet limited) capability of simultaneous determination of more than one element, and particularly the determination of nonmetals via the absorption of their diatomic molecules.

And now...? Now we are waiting for MOSES to show us the way to the Promised Land and real simultaneous multi-element determinations of trace metals and nonmetals – therefore I cannot think about retirement yet.