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Foreword

Mass spectrometry is one of the most important analytical techniques used today for the determination of element concentration, for surface and isotope analysis, and for structural analysis of organic and bioorganic compounds due to its very high sensitivity and low detection limits. The importance of bioinorganic mass spectrometry has increased rapidly in the last few years due to a significant improvement of analytical techniques with respect to sensitivity, dynamic range, detection limits, precision and accuracy. This special issue of the International Journal of Mass Spectrometry concerns the growing significance of bioinorganic mass spectrometry, elemental imaging and metallomics studies with 32 scientific contributions (including 8 invited reviews) of more than hundred authors from 14 nations: Austria, Belgium, Brazil, Canada, China, France, Germany, Israel, Monaco, Spain, Switzerland, Thailand, United Kingdom and USA.

A number of publications on bioinorganic mass spectrometry developed and employed elemental mass spectrometric techniques [such as ICP-MS (inductively coupled plasma mass spectrometry) and LA-ICP-MS (laser ablation ICP-MS)] for quite different applications in life science studies and medicine. Partly these elemental mass spectrometric techniques were combined with biomolecular mass spectrometry (MALDI-MS, ESI-MS or LC–MS/MS) to obtain new information on biological or clinical samples. Several papers focus on fundamental, methodological, instrumental and Software developments, novel analytical approaches and challenging applications. "Metallomics" as a new frontier in the investigation of trace elements in biology has been the topic of a number of papers in this special issue reflecting its huge potential. New directions of mass spectrometry imaging (MSI) of elements in the life sciences is one of the greatest challenges, combining the multielemental measurement capability of mass spectrometers with surface sampling processes using either a focused laser or an ion beam. Another challenging task of analytical chemistry – the determination of small abundances of stable isotopes and long-lived radionuclides at low concentration levels for the study of isotope variation in biological samples and in environmental science (environmental monitoring) – are discussed at the end of Special Issue.

This Special Issue "Bioinorganic Mass Spectrometry, Elemental Imaging and Metallomics" is dedicated to Dr. habil. Hans-Joachim Dietze on occasion of his 75th birthday in recognition of his many scientific achievements.

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