Ciprian Mihai Cirtiu, J Anal Bioanal Tech 2018, Volume 9
DOI: 10.4172/2155-9872-C2-030

Advances in ICP-MS: Clinical applications and human bio-monitoring

Ciprian Mihai Cirtiu
National Institute of Public Health of Quebec, Canada

Inductively Coupled Plasma Mass Spectrometry (ICP-MS) is now regarded as one of the most powerful analytical techniques for trace and ultra-trace analysis of elements. It finds applications in various fields and applies to different matrices like environmental (air and water quality check, waste water treatment plants), geochemical (soil), drugs and pharmaceutics (quality control), food and beverages, petrochemical as well as biological matrices (clinical, occupational and environmental medicine, human bio-monitoring). ICP-MS coupled to separation techniques (chromatography) is proving an invaluable detection technique to characterize elemental species (toxicology, quantitative proteomics). A more recent way to use ICP-MS is in time-resolved mode, which allows analyzing nanoparticles in Single-Particle ICP-MS mode (SP-ICP-MS). At the Centre de Toxicologie du Quebec, a branch of the Institute National de Sante Publique du Quebec (INSPQ, Quebec, Canada) we are aiming at developing ICP-MS-based analytical methods to assess trace and ultra-trace elements in biological matrices. The methods are developed and validated following general guidelines of ISO/IEC 17025. In the present work, an overview of various recent applications of ICP-MS methods will be given, with focus on clinical applications (screening, speciation, toxicology), bio-monitoring (health surveys) and preparation of proficiency testing materials as part of the quality assessment schemes organized by CTQ. Current research and development activities are directed towards the development of new technologies and methodologies for the analysis of emerging products in order to advance knowledge in terms of toxicology and human bio-monitoring.

Biography

Ciprian Mihai Cirtiu has completed his PhD in the Université de Sherbrooke (2007) on the development of functionalized materials for the electro-catalytic hydrogenation reaction. From 2007 to 2008, he has worked as Post-doctorate at UQAM on the fabrication and characterization of semi-conductive nanoparticles for electrochemical solar cell and olivine-type lithium-iron phosphate nanoparticles for Li-ion batteries. In 2008, he joined the group of Professor Audrey Morres in McGill University as Postdoctoral Fellow to work on the development of new hybrid materials for catalytic reactions as well as the synthesis, characterization and application of zero-valent iron nanoparticles for groundwater remediation. He has joined the "Centre de Toxicologie du Québec" at Institut National de Santé Publique de Québec in 2011 as Analytical Development Chemist. In January 2013 he was named Head of Trace Metals Division. His research activities are oriented towards the development of new technologies and methodologies for the analysis of emerging products (nanoparticles, metals, rare earths elements, etc.) in order to advance knowledge in terms of toxicology and human bio-monitoring. He has 23 articles in peer reviewed journals, 2 patents, 38 oral communications and 25 posters to his credit.

ciprian-mihai.cirtiu@inspq.qc.ca

Notes: