Kazuya Takahashi, J Chromatogr Sep Tech 2017, 8:3(Suppl)
DOI: 10.4172/2157-7064-C1-026

New method for comprehensive detection of trace elements in environmental or biochemical materials using an electron-cyclotron-resonance ion-source mass spectrometer

Kazuya Takahashi
RIKEN, Japan

We have developed a detection technology for trace elements, including their chemical complexes, based on an element analytical system using an electron-cyclotron-resonance ion source (ECRIS). An electron exhibits cyclotron motion in a magnetic field and is accelerated resonantly upon applying a high frequency. This phenomenon is called electron cyclotron resonance (ECR). ECR has been used as the ion source in accelerator facilities. We have focused our attention on the stability and high ionization efficiency of ECRIS (ECR Ion Source) and we employed ECRIS to customize a mass spectrometer to realize ECRIS mass spectroscopy (ECRIS-MS). Using ECRIS-MS, the following three applications were carried out. (1) Isotopic analyses of trace elements in geochemical or environmental materials. (2) Trace analyses of metal ions in biological or medical samples such as blood. (3) Monitoring of hazardous chemicals such as chemical warfare agents (CWAs) in the atmosphere. In particular, for applications (1) and (2), sputtering and laser ablation techniques has been also employed to assist sample introduction into the ion source without any complicated chemical procedures. These applications are expected to contribute to the environmental and biochemical research fields. For the monitoring of hazardous chemicals (3), a vapor sample is introduced directly into the ion source, and the molecular material was decomposed into elements using the electron cyclotron resonance plasma and ionized. We will present details of the potential of ECRIS-MS for the detection and identification of trace elements in various environmental or biochemical samples.

Biography

Kazuya Takahashi has completed his PhD at the age of 28 years from University of Tokyo, Japan. He gas een major in analytical chemistry, especially mass spectrometry. He is a senior research scientist in RIKEN.

kazuyat@riken.jp

Notes: