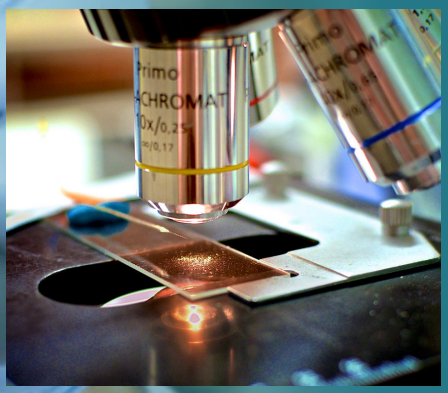

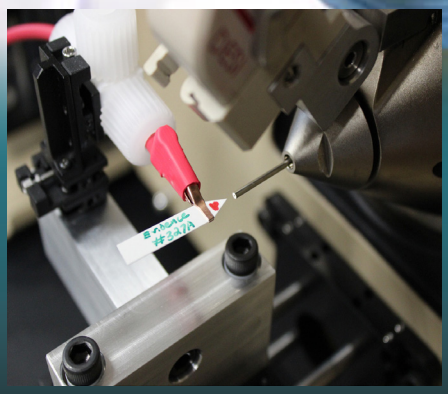

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Day 1

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Ionic liquids as stationary phase in GC: An innovation for improving food, environmental and petrochemical analysis

Ionic liquids are organic salts with low melting point, which are liquid at room temperature. These liquids are unique combination of organic cations and anions and can provide a variety of different chemical properties that are beneficially used as solvents, sealants or electrically conducting liquids. When used as stationary phases in capillary gas chromatography these properties provide completely different selectivity's than conventional phases. The application of di- and polyionic liquids for GC has especially led to a breakthrough in stability and maximum temperature. The majority of the polyionic liquid phases that we have been evaluating possess polar and highly polar properties similar to polyethylene glycol based or biscyanopropylpolysiloxane based GC phases. This work focuses on the fundamentals of this innovative GC stationary phase technology. The selectivity differences compared with conventional stationary GC phases will be presented. This different selectivity results often in increased resolution and/or shorter run times. Recent Solvation Parameter Model (SPM) evaluations indicate that only ionic liquid columns are capable of simultaneously providing intense H-acceptor and intense H-donor interactions, along with dipolar and pi-pi interactions. These phases have been investigated for a number of different samples including petrochemical, environmental and food and beverage. Due to the unique selectivity the new ionic liquid GC phases enable superior separation of in these application areas. Even the analysis of the water content of the injection of aqueous samples using gas chromatography is now possible with the GC columns based on ionic liquids.

Biography

Frank Michel has received his Diploma and PhD in Analytical Chemistry from University of Muenster on HPLC development. He has then led the HPLC lab of Bernina Biosystems, a biopharmaceutical company in Munich, Germany. He returned in 2010 to Sigma-Aldrich as Analytical & Chromatography Technology Specialist. Since 2015, he supports APAC region as Analytical and Chromatography Scientific Advisor. He is a Member of Separation Science working group in the German Chemist Society (GDCh) and Scientific Advisory Board of Analytix conference.

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Aspects of recent developments of smart multi-way calibration methods coupled with LC-MS and LC-DAD in analytical chemistry

Multi-way calibration methods having second-order or extended advantages are gaining more and more attentions in the field of analytical sciences. It is a smart and green quantitative analysis strategy based on mathematical separation for complicated chemical systems when combined with advanced analytical instruments capable of generating multidimensional arrays, e.g. HPLC-DAD, LC-MS and EEMs. It enables one to quantify directly and rapidly the component(s) of analytical interest even in the presence of unknown interferences not included in the calibration samples and makes the final goal of analytical chemistry achievable even without the aid of complicated separation procedures. These multi-way calibration methods could be applied to resolve different problems of qualitative and quantitative analysis in complicated chemical systems by combining with the advanced analytical instruments. The performances of these algorithms have been evaluated by using simulated and real experimental datasets. They have been utilized to simultaneous or direct determinations of multiple component(s) of analytical interest in many fields such as pharmaceutical, biomedical, environmental, food sciences. The main points on successful applications of these chemometric methods combined with advanced analytical instruments have been also summarized. Some recent developments on the theories and their applications of multi-way calibration methodologies including second- and third-order calibration are also reviewed in detail.

Biography

Hai Long Wu is a Professor of Analytical Chemistry of the College of Chemistry and Chemical Engineering at Hunan University since 1999 and the Former Director of the State Key Laboratory of Chemo/Biosensing and Chemometrics, Hunan University. He has completed his BS in 1982 and MSc in 1985 as well as Doctor of Science in 1992 in Analytical Chemistry from Hunan University. He has worked at Hunan University during and then went to Japan and received his Doctor of Engineering in Applied Chemistry from Chiba University, Japan in 1998. He has published over 230 papers in LC-DAD, LC-MS, chemometrics and chemical sensors in international journals.

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