Professor Igor Platonov

Head of Chemistry Department, Director, Research and Educational Center (REC) Chromatography, Samara National Research University of Russia, his interests are Analytical chemistry, chromatography, micro- and nanotechnology, sensors, microfluidic systems. He was postgraduate student, postdoctoral researcher and HOD, Research and Management, Samara State University of Russia. He was a recipient of "Best prospective project" at the 9^{th} international specialized exhibition-forum "Industrial Salon - 2010" and 1^{st} place at the III Regional Youth Exhibition "Techno Park 2013". He has a significant contribution in Ministry of Industry and Technology of Samara Region for the development of the chemical industry.

Keynote Speaker

Micro and Nanotechnologies in Chromatographic Analysis

Abstract

Gas chromatography is one of the few versatile methods for qualitative and quantitative analysis of complex mixtures of organic compounds. The key element of this method is a chromatographic column, which defines the scope and largely the equipment background of the method. During the long history of chromatography, the design of the column has substantially transformed. A new technology for the manufacture of chromatographic columns is currently being developed. It is based on methods designed initially for fabrication of microelectromechanical systems (MEMS). These methods enable significant reduction in size for the majority of typical items around us including analytical instruments. Using rigidly standardized MEMS technologies for the manufacture of columns, these limitations can be overcome. Moreover, the existing MEMS technologies are able to form phase and sorbent micro- and nanolayers on the inner surface of the channels without human intervention. This is in line with the modern trend of technology, that is, development of methods that exclude human error in the manufacturing process. The report presents data on the use of this technology for manufacture of gas chromatography capillary columns. The methods for preparation of capillaries and the influence of their shape and configuration on the chromatographic properties of the columns are considered. The methods for stationary phase introduction into capillaries, both traditional for capillary gas chromatography and borrowed from the semiconductor and microelectromechanical technologies are discussed. The unique properties of semi-packed columns obtained using microelectromechanical techniques are considered. The possible applications of such columns and the ways of their further development are discussed.