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Modern High Performance Liquid Chromatography and HPLC 2016 International Symposium

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This year, our worldwide chromatography community will be celebrating 50 year anniversary of high performance liquid chromatography. 13 August 1966 Csaba Horvath and Seymour Lipsky are published in Nature their report about first high pressure separation of organic compounds on a self-packed ion exchange chromatographic column, entitled: "Use of Liquid Ion Exchange Chromatography for the Separation of Organic Compounds". Year latter was introduced first commercial HPLC instrument by Waters. To emphasize the major technological difference from typical at that time low pressure applications, HPLC meaning was "High Pressure Liquid Chromatography".

Before 1966 liquid chromatography utilized either gravity flow or low pressure pumps for an eluent delivery. Typical applications there are protein separations using ion exchange and gel filtration, inorganic anion exchange chromatography and normal phase separations of various organic substances using self – packed silica columns. Isolation range was varied from analytical to preparative. In retrospect, chromatography as a science begun in 1900, when Russian botanist Michail Tsvet observed separation of a mixture of chlorophyll pigments and carotenoids on a wet filter paper. Next, he built the first chromatography column packed with $CaCO_3$ as a stationary phase, and performed pigments separation by ethanol or benzene gravity flow elution. Separation mechanism he called as "adsorption chromatography". In 1918 Mikhail Tsvet has been nominated to the Nobel Prize on medicine for his discovery, however his candidacy was declined. Nevertheless, chromatography quickly becomes a popular tool in chemical and biological laboratories and in industry.

In early 70th were introduced first models of chromatographic equipment supporting 400 bar (6000 psi) operating pressure. 400 bar benchmark become a standard for the next 30 years and nowadays these systems are called as "conventional HPLC". In parallel with HPLC hardware evolution, was made significant progress in column packing material technologies and subsequent transition from pellicular to spherical particles. As result HPLC evolved into the "High Performance Liquid Chromatography".

To facilitate communications between different research groups, manufacturers and chemical industry, to bring them together and to discuss novel developments and applications, as well as fundamental aspects of separation sciences, in 1973 was organized first HPLC meeting. Until 1981 HPLC meeting have being held biennially. Advances in a field of liquid chromatography and constantly growing scientific and practical interest to HPLC are made HPLC conference as the key event and trade show. Since 1981 HPLC meeting alternates between United States and Europe (even years in USA).

In June 19-24 in San Francisco, CA, USA took place 44th International Symposium on High Performance Liquid Chromatography, HPLC 2016. This major event in a field of chromatography attracted near 1000 chromatography experts from industry and academia around the World. During 4 days of the conference were presented near 200 lectures on parallel sessions, free tutorials and plenary talks.

Myself, as a senior LC/MS professional, am attending this meeting since 2004. Compare to previous events, various liquid chromatography - mass spectrometry applications, proteomics and metabolomics become predominant at the present meeting. Mass spectrometry is available for chromatographers already for a few decades, however LC/MS applications in proteomics and metabolomics were discussed at the different meetings. Mass spectrometry provides mass-to-charge resolution of ions. Triple quadrupole mass spectrometers deliver more specificity; accurate mass instruments– better accuracy in m/z measurements, ion mobility – better selectivity. In my perspective, this shift to mass spectrometry applications is evident that baseline separations and LC/UV applications era is on its sundown phase. Mass spectrometry now is the main technique and for complex analysis and for difficult separations. Nowadays chromatographers are looking for better detection –by mass spectrometry and not for a better column separation efficiency.

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