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Marek Trojanowicz

Laboratory for Flow Analysis and Chromatography
Department of Chemistry, Warsaw University
Pasteura 1, 02-093 Warsaw, Poland
trojan@chem.uw.edu.pl

Progress in analytical instrumentation is forced by numerous factors. They include increasing demand for chemical analyses in numerous fields of contemporary human activity, need for improvement of functioning of analytical instruments, and increasing demands for devices for direct application of end-users without necessity of employing highly specialized analytical laboratories. One of trends of this evolution of analytical instrumentation is observed since half a century as development of laboratory flow methods of analysis and appropriate instrumentation, with increasing tendency to miniaturization of this instrumentation based on progress in material science, electronics, computer science and micro-mechanics.

The miniaturization of measuring instruments for injection methods of flow analysis is observed since 1980s by design of microconduits, integrating miniaturized detectors with other parts of flow manifold, by replacing common peristaltic pumps with syringe or piezoelectric driven pumps, or by incorporation several parts of manifold (SPE columns with solid sorbents, optic fiber based spectrophotometric flow-cells, electrochemical detectors) into rotary injection valve, that was named as *lab-on-valve* systems. They are devices of centimeters size and internal diameters of flow channels in fraction of millimeters.

A significant mile-stone in miniaturization of instrumentation for flow analysis was its scaling down in the beginning of 1990s to format of microfluidics. Diameters of flow channels were reduced to few tens of microns, and besides flow injection methods they find rapidly increasing applications in capillary electrophoretic methods.

The beginning of twenty first century is in science and technology recognized as age of nanotechnology, which in simplest way can be described as preparation and utilization of materials, devices and systems by controlling the matter in nanometer dimensions. Nano-scale objects exhibit numerous physical properties based on quantum phenomena, and different optical and electromagnetic properties, different than those of larger objects of the same chemical composition. The main feature of nanostructures is their self-assembling in suitable conditions. One of most commonly examined and employed nanostructures are *e.g.* carbon nanotubes, that have already found also various analytical applications.

Nanostructures are also increasingly employed in instrumentation for flow analysis. One stream of these applications includes their use for improvement of various detectors. The self-assembled monolayers on metal surfaces find numerous applications in chemical and biochemical sensors employed in flow analysis, with especially significant place of surface plasmon resonance detectors. For the same purpose supported bilayer lipid membranes are used. Carbon nanotubes are employed for modification of electrodes in electrochemical flow-through electrodes and for continuous solid-phase extraction.

There is also increasing interest in development of flow systems in the scale of nanometers. In designed nanofluidics nanometer size concerns the diameters of flow channels and further miniaturization of detection devices. Currently published papers deal mainly with theoretical prediction and interpretation of phenomena and interactions occurring at this scale, but they are associated also with some technological advancement in this area of nanotechnology. During transport of molecules inside channels of sub-micro diameters one can observe a changes of proportions of physical and chemical interactions in comparison to microfluidics.

The open area for design of nanofluidics for analytical purposes is the use of nanomechanics or in another words molecular mechanics, that concern design of nanostructures, which can produce mechanical energy *in-situ* based on the use of chemical reactions or electrical polarization. It seems to be not too distant future that micro- and nanomachines, powered electrochemically or chemically, might be employed for transfer of mass in nanofluidics, for enhancement of detection by improvement of transport of analyte to detectors, or by transfer of nanoparticles in the flowing system, which may play a role of multi-phase separation systems.