Preface

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Tremendous progress has been made in China in the field of nanomaterials and in (bio)analytical sciences and sensing in the past decade. During an extended visit of Prof. O. Wolfbeis, the Editor of *Microchimica Acta* (MCA), to China the idea was generated to collect a representative number of articles in this field for publication in a themed issue of MCA with its focus on (bio)analytical uses of micro- and nano-materials. The three Guest Editors are proudly presenting here the first (of two) Special Issues dedicated to the topic “(Bio)analytical Nanotechnology China 2014”. We believe that these two issues are reflecting highly representative work and also demonstrate the very high level of nanotechnology in China.

Overall, it appears that nanotechnology also will have a large impact on chemistry. Here, the focus is on new materials, some with properties that are entirely different from those of the respective molecular species or bulk materials. These features, in turn, will lead to so-far unknown methods and applications in analytical sciences. Predictably, this is an aspect that is more thrilling than trying to replace existing methods that often perform adequately well. However, the use of nanomaterials also requires new methods for their

characterization because conventional methods (such as mass spectrometry or NMR) often are not applicable or adequate. It is becoming more and more obvious that nanotechnology is becoming a field of its own.

Bioanalytical nanotechnology is a subdiscipline of nanotechnology that has many (and additional) facets. These range from advanced nanomaterials to new sensing schemes, from assays to sensors, and from environmental to medical and other applications. Representative nanomaterials include quantum dots, nanoparticles made from noble metals, metal oxides or semiconductors, lanthanide particles, soft (organic) particles, upconversion nanoparticles, mesoporous networks, metal-organic frameworks, carbonaceous nanomaterials (such as MWCNTs, graphenes or carbon dots), core-shell particles, hybrid (composite) materials, conductive polymers, and the like. In terms of sensing, electrochemical methods (such as voltammetry, potentiometry, amperometry or electrochemiluminescence) are state of the art. Modern optical methods include fluorescence, surface plasmon resonance and chemiluminescence. Other aspects covered in these issues include enzyme-less sensing, advanced methods of imaging, combinations of separation and detection as exemplified by methods of immuno-chromatography along with visual (bare eye) detection, or analyte preconcentration, all based on the use of nanomaterials. In terms of applications, typical subjects include clinical sensing and immunoassays, detection of (bio)chemical species using oligomers or aptamers), and of organic and inorganic pollutants of the environment. Two reviews (one on advances in enzyme-free electrochemical sensors for hydrogen peroxide, glucose, and uric acid, and another on conducting polymer composites with graphene for use in chemical sensors and biosensors) complete the issue.

We would like to take this opportunity to thank all the authors for their tremendous efforts in preparing such excellent articles. We also thank the many

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reviewers that have made numerous constructive comments on the manuscripts and thereby have further contributed to the quality of the papers.

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