Nanotechnology and Precision Engineering 3 (2020) 1

Contents lists available at ScienceDirect

Nanotechnology and Precision Engineering

journal homepage: http://www.keaipublishing.com/en/journals/nanotechnology-and-precision-engineering/

Foreword to the special issue on micro/nano biosensors

Micro/nano biosensors had rapidly progressed and enabled a verity of applications that were otherwise impossible/challenging with traditional methods. The three key components in micro/nano biosensors consist of (1) the analyte preparation (living cells or biomarker molecules), (2) signal transduction (from bio-signal/event to more readable electronic/optical signal), and (3) signal readout (preferably by integrated instrumentation). A verity of work has been dedicated to each of these three areas. It is now evident that micro/nanotechnology is playing a significant role in the development of cell and molecule biosensors. The performance of biosensors was significantly enhanced by combining the micro/nanostructures, which present unique physical and chemical characteristics due to various effects at these scales. Over the decades, many studies have been carried out to employ micro- and nano-based biosensors at the cellular or molecular level. Common aims among these novel biosensors were to achieve the characteristics of high sensitivity, high specificity, low detection limit, rapid response time, and easy-to-use.

This special issue contains contributed papers in different areas of micro/nano biosensors. Topics include label-free nanopore sensors (both biological nanopores and solid-state nanopores),[1,2] intracellular delivery of biologically active macromolecules into living cells,[3] smartphone-enabled cytometric biosensors for point-of-care cellular diagnostics.[4] In addition, it also includes micro/nanoscale pressure sensors for smart wearable devices and health monitoring systems,[5] which is an emerging topic. I think this special issue would shed light on new ideas and new starting points of research in the micro/nano biosensors field. I believe the integration of micro/nanofabrication, micro/nanotechnology, biomedicine, electronics, and photonics makes it not only possible but also exciting to innovate the next generation of biosensors (and bioinstrumentation) towards various applications yet to be imagined.

I would like to thank all the authors for their excellent contributions, the reviewers for the timely and constructive feedbacks and Ms. Yuanyuan Sun of Nanotechnology and Precision Engineering for the kind and prompt help.

References

1. Wei X, Zhang Z, Wang X, et al. Insight into the effects of electrochemical factors on host-guest interaction induced signature events in a biological nanopore. Nanotechnol Precis Eng 2020;3(1):2-8.
2. Liang S, Xiang F, Tang Z, et al. Noise in nanopore sensors: sources, models, reduction, and benchmarking. Nanotechnol Precis Eng 2020;3(1):9-17.
3. Sun M, Duan X. Recent advances in micro/nanoscale intracellular delivery. Nanotechnol Precis Eng 2020;3(1):18-31.
4. Zhang S, Li Z, Wei Q. Smartphone-based cytometric biosensors for point-of-care cellular diagnostics. Nanotechnol Precis Eng 2020;3(1):32-42.
5. Chang Y, Zuo J, Zhang H, et al. State-of-the-art and recent developments in micro/nanoscale pressure sensors for smart wearable devices and health monitoring systems. Nanotechnol Precis Eng 2020;3(1):43-52.

Weihua Guan*
Associate Editor, Nanotechnology and Precision Engineering Assistant Professor, Department of Electrical Engineering and Department of Biomedical Engineering (Courtesy), Pennsylvania State University, University Park, PA 16802, United States
E-mail address: w.guan@psu.edu (W. Guan).

https://doi.org/10.1016/j.npe.2020.02.001