Editorial

Bin Su¹

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Electrochemiluminescence (ECL) is a luminescent phenomenon, in which the emissive excited-states are generated under dark conditions by electrochemical reactions involving heterogeneous charge transfer between electrode(s) and emitters (and co-reactants) in solution. It has attracted tremendous research attention and been successfully applied in commercial immunodiagnostics for the quantitative determination of a broad range of disease biomarkers, due to its remarkable features such as short detection time (less than 20 min), wide measuring range (over six orders of magnitude), low sample consumption (dozens of microliter), high on-board stability (highly stable reagents), excellent precision and sensitivity (near-zero background interference). Totally several billions of ECL immunodiagnostic tests are commercially run worldwide a year. In addition to diagnostics applications, ECL has also been developed as a versatile and powerful technique for fundamental research in diverse fields, such as biosensing, nanocatalysis, environmental monitoring and so on. This is why this special issue is organized by the editorial office of *Journal of Analysis and Testing*.

Journal of Analysis and Testing is devoted to providing an international academic platform for the publication of original research papers, rapid communications and critical reviews dealing with all aspects of fundamental and applied analytical chemistry. The goal of this special issue is to highlight the most recent and exciting new developments in the field of ECL. It features three review papers and four research articles. In the review paper contributed by Professor Yuanjian Zhang from Southeast University, the latest progress of new ECL biosensing systems, in particular emerging new luminophores, co-reactants and involved reaction mechanisms, are summarized. Possible limitations and exciting future developments of the ECL biosensing are also

complementarily discussed. Since ECL imaging is capable of providing unique spatially-resolved information on the reaction mechanism and offering the possibility of high-throughput visual analysis, Professor Guobao Xu at Changchun Institute of Applied Chemistry of Chinese Academy of Sciences and Professor Qiang Ma at Jilin University present an overview of recent progress on ECL-imaging based analysis in their respective review papers. The topic of four research articles included in this issue ranges from new ECL materials to novel biosensing methodologies. Professor Neso Sojic at the University of Bordeaux describes the fabrication and characterization of ECL-active hydrogel films with tunable thickness, which are thermally stimuli-responsive and promising for developing new (bio)sensors. Professor Honglan Qi from Shaanxi Normal University presents the fabrication of ECL sensor array using two bis-cyclometalated Ir(III) complexes as ECL probes for the discrimination of three bithiols, namely homocysteine, cysteine and glutathione. Professor Dechen Jiang's group at Nanjing University reports the covalent assembly of a luminol analog on the indium tin oxide surface and its ECL generation for the detection of H₂O₂, showing potential applications in the detection of cell efflux. Professor Zhenyu Lin and his group at Fuzhou University describe a novel sensitive strategy for breast cancer detection based on H₂O₂-triggered release of ECL-generating molecules incorporated inside mesoporous silica nanoparticles.

This special issue only collects a rather limited number of works in the field of ECL. We hope they can be useful for readers to catch not only what have been doing but also what to do. The future of ECL is definitely prosperous and will be more prosperous with more novel high-performance ECL materials, instrumentations and methodologies being developed. It is truly my great pleasure to interact with all the authors and organize the collection of contributions. The organization of this special issue is accomplished in the difficult period of coronavirus pandemic. So I am sincerely grateful to the authors for contributing high-quality manuscripts, the referees for their efforts in reviewing these papers and the Editorial Office for their technical assistance.

✉ Bin Su
subin@zju.edu.cn

¹ Institute of Analytical Chemistry, Department of Chemistry, Zhejiang University, Hangzhou 310058, China

Bin Su Bin Su received the B.I. in Fine Chemical Engineering from Jilin University in 1999, M.S. in Chemistry from Changchun Institute of Applied Chemistry of Chinese Academy of Sciences in 2002 and Ph.D. from Ecole Polytechnique Federal de Lausanne in 2006. After postdoctoral research

at the same school, he joined the Department of Chemistry at Zhejiang University in 2009. He is currently a full professor of analytical chemistry and serves as the director of Institute of Analytical Chemistry at Zhejiang University. His research interests are mainly in the field of electroanalytical chemistry, including electrochemiluminescence, in vivo electroanalysis, implantable and wearable sensors. He has published over 140 papers in his academic career.