

## Special Issue on future directions in plasma nanoscience

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Over the past 20 years, plasma nanoscience has become a mature and vibrant field. It deals with both the fundamental science and applications of low-temperature plasmas, ion beams, lasers, and related approaches and how this relates to the fabrication, synthesis, modification, and integration in and of nanoscale materials, structures and functional devices. The complexity often encountered in research in this field intrinsically calls for both fundamental and applied research, both experimental and theoretical. Plasma nanoscience, therefore, is a highly multidisciplinary field, bringing together researchers from physics, chemistry, medicine, engineering, biochemistry, informatics and more.

In this context, a dedicated conference is annually organised to bring researchers together and drive the plasma nanoscience field forwards—the iPlasmaNano conference, founded by Prof. Dr. Ken Ostrikov. The first edition was organised in 2009 in Piran, Slovenia, chaired by Prof. Dr. Uros Cvelbar. Subsequent editions were organized in Australia (2010, Ken Ostrikov), Singapore (2012, Shuyan Xu), California, USA (2013, Mohan Sankaran), Spain (2014, Angel Barranco), China (2015, Xingguo Li), Greece (2016, Evangelos Gogolides), Antwerp (2017, Erik Neyts), and Michigan, USA (2018, David Go). In 2019, the conference is organised in Croatia by Eva Covacevic.

Corresponding to the broad scope of the field, the topics discussed at the iPlasmaNano conference are very broad as well, including:

- Fabrication of organic and inorganic nanomaterials and nanostructures using vacuum or atmospheric plasmas or ion beams and control of their functionality and surface properties;
- New plasma processes in vacuum or atmospheric pressure, as well as at the surface or inside liquids, for nanoscale fabrication, green nanofabrication, improvement of industrial processes, sustainable lifecycles of natural resources;
- Applications of plasma nanotechnology in catalysis (plasma nanocatalysis), photonics and plasmonics, energy and energy harvesting, life sciences and chemistry;
- Plasmas at new spatiotemporal scales: micro and nanoplasmas, nanosecond pulsing, nanoplasmas generated by ultrafast intense radiation;
- Modeling and diagnostics of plasmas;
- Entrepreneurial efforts in plasma nanotechnology.

This Special Issue in *Frontiers of Chemical Science and Engineering* themed “The Future of Plasma Nanoscience” is the direct result of the iPlasmaNano-VIII conference held in 2017 in Antwerp, Belgium. This edition focused on modeling and simulation of fundamental processes, plasma nanocatalysis, plasma medicine, nanomaterials and plasmas for micro-electronics. Correspondingly, this Special Issue contains contributions directly in these areas [1–18]. I would hereby like to thank all authors for their contributions, as well as all reviewers for their efforts. Further, I would also like to thank the Editors-in-Chief of *Frontiers of Chemical Science and Engineering*, and the Managing Editors for all their efforts in organising this Special Issue.

It is my sincere wish that the research results, reviews and perspectives presented in this Special Issue will be inspiring for future research in plasma nanoscience!

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Erik C. Neyts is a professor in physical chemistry at the University of Antwerp, Belgium. His research focusses on atomic scale modeling and simulation of nanostructures and plasma–surface interactions. He has authored over 150 peer-reviewed papers and has given over 60 invited presentations. He served as Guest Editor for *Journal of Physics D: Applied Physics* (2014) on “Fundamentals of Plasma–Surface Interactions” and *Catalysis Today* (2015) on “Plasmas for Catalysis”, and received the B. Eliasson Award for his work on plasma catalysis in 2016. In 2017, he chaired the iPlasmaNano-VIII conference in Antwerp. Since 2019, he is member of the editorial board of *Frontiers of Chemical Science and Engineering*.