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Editorial

Liquid Crystal Optical Devices

Leszek R. Jaroszewicz * and Noureddine Bennis

Military University of Technology, Institute of Applied Physics, 00-908 Warsaw, Poland; noureddine.bennis@wat.edu.pl

* Correspondence: leszek.jaroszewicz@wat.edu.pl

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It has been approximately 125 years since the Austrian scientist Friedrich Reinitzer in 1888 observed the curious behavior of the double melting points of cholesterol benzoate, a discovery that today is widely recognized as liquid crystal science. This discovery triggered a new area of research, engaging physicists and chemists around the world. The high optical anisotropy of liquid crystals implies large phase shifts in very short optical paths. Furthermore, their strong electro-optical effect allows for the rapid reorientation of their optical axis with, indeed, very low voltage in the range of only a few volts, hence, making liquid crystals compatible with current silicon technology [1]. Liquid crystal optical devices have provided the driving force for large amounts of research in photonics [2,3]. This technology has tremendous potential for technological breakthroughs in various fields and applications, from integrated optics [4] to detection and sensing [5]. The possibility to develop multifunctional macromolecular structures makes liquid crystals highly attractive candidates in the field of materials science and may represent an original strategy for the realization of molecular electronics-based devices [6].

As Guest Editors for the Special Issue "Liquid Crystal Optical Devices", we are pleased to present important contributions which are regularly submitted manuscripts, selected and reviewed via the regular system and accepted for publication. All papers presented here are based on original qualitative or quantitative research that opens new areas of inquiry and investigation in the field of liquid crystal optical devices.

The contents of this Special Issue reflect the rapid progress taking place in the field of liquid crystal devices. The first highlight of this thematic edition is an article entitled "Liquid Crystal Beam Steering Devices: Principles, Recent Advances, and Future Developments," by Ziqian He et al. [7], fellow researchers from the University of Central Florida, Orlando, USA. This article addresses the general operating principles of liquid crystal (LC) beam steering devices. The paper also focuses on two specific future challenges: fast response mid-infrared beam steering and device hybridization for large angle, high-efficiency beam steering.

The second highlight is an article entitled "Multifrequency Driven Nematics," by Noureddine Bennis et al. [8], fellow researchers from the Military University of Technology, Warsaw, Poland. This article addresses a novel LC mixture with frequency tunable capabilities. The tunability with frequency and the fast switching makes this LC of special interest for all kinds of optical phase modulators.

The third highlight is an article entitled "Recent Advances in Adaptive Liquid Crystal Lenses," by José Francisco Algorri et al. [9], fellow researchers from the University of Madrid, Leganés, Madrid, Spain. The authors reviewed recent advancements in adaptive LC lenses, introducing LC science and promising applications. Furthermore, novel applications of LC lenses were reviewed and the prospects and challenges of adaptive-focus LC lens technology were highlighted.

We anticipate that you will find all six articles presented in this special edition to be intriguing, thought provoking, and useful in reaching new milestones in your own research. Liquid Crystal Device is an important and interesting topic that we would like to keep attracting submissions in this field.

Now the editorial office of Crystals is running the second volume on this topic. Please recommend the journal *Crystals* to your colleagues and students to make this endeavor even more meaningful. All the papers published in this edition underwent a peer-reviewed process involving a minimum of two reviewers comprising internal as well as external referees.

We want to thank the authors for agreeing to publish their papers in this Special Issue, as well as the reviewers involved in the publishing process of these papers. We would also like to thank the *Crystals* publication Staff, who have produced a high-quality edition of this journal under the tight schedule required for this Special Issue.

We hope that this Special Issue will serve as a useful archival reference, providing access to information on liquid crystal optical devices.

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