PROCEEDINGS OF SPIE

Emerging Liquid Crystal Technologies XIII

Liang-Chy Chien
Dirk J. Broer
Igor Muševič
Vladimir G. Chigrinov
Editors

29–31 January 2018 San Francisco, California, United States

Sponsored and Published by SPIE

Volume 10555

The papers in this volume were part of the technical conference cited on the cover and title page. Papers were selected and subject to review by the editors and conference program committee. Some conference presentations may not be available for publication. Additional papers and presentation recordings may be available online in the SPIE Digital Library at SPIEDigitalLibrary.org.

The papers reflect the work and thoughts of the authors and are published herein as submitted. The publisher is not responsible for the validity of the information or for any outcomes resulting from reliance thereon.

Please use the following format to cite material from these proceedings:

Author(s), "Title of Paper," in *Emerging Liquid Crystal Technologies XIII*, edited by Liang-Chy Chien, Dirk J. Broer, Igor Muševič, Vladimir G. Chigrinov, Proceedings of SPIE Vol. 10555 (SPIE, Bellingham, WA, 2018) Seven-digit Article CID Number.

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510615953

ISBN: 9781510615960 (electronic)

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA Telephone +1 360 676 3290 (Pacific Time). Fax +1 360 647 1445

SPIE.org

Copyright © 2018, Society of Photo-Optical Instrumentation Engineers.

Copying of material in this book for internal or personal use, or for the internal or personal use of specific clients, beyond the fair use provisions granted by the U.S. Copyright Law is authorized by SPIE subject to payment of copying fees. The Transactional Reporting Service base fee for this volume is \$18.00 per article (or portion thereof), which should be paid directly to the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923. Payment may also be made electronically through CCC Online at copyright.com. Other copying for republication, resale, advertising or promotion, or any form of systematic or multiple reproduction of any material in this book is prohibited except with permission in writing from the publisher. The CCC fee code is 0277-786X/18/\$18.00.

Printed in the United States of America Vm7 i ffUb 5 gpc WJUHY gr + DWz i bXYf "JW bgY Zfca 'GD-9.

Publication of record for individual papers is online in the SPIE Digital Library.



Paper Numbering: Proceedings of SPIE follow an e-First publication model. A unique citation identifier (CID) number is assigned to each article at the time of publication. Utilization of CIDs allows articles to be fully citable as soon as they are published online, and connects the same identifier to all online and print versions of the publication. SPIE uses a seven-digit CID article numbering system structured as follows:

- The first five digits correspond to the SPIE volume number.
- The last two digits indicate publication order within the volume using a Base 36 numbering system employing both numerals and letters. These two-number sets start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B ... 0Z, followed by 10-1Z, 20-2Z, etc. The CID Number appears on each page of the manuscript.

Contents

| vii | Authors |
|----------|--|
| ix | Conference Committee |
| xi | Introduction |
| | CHIRAL, NANOSTRUCTURED MATERIALS, AND APPLICATIONS |
| 10555 04 | Polymer-stabilized liquid crystalline topological defect network for micro-pixelated optical devices (Invited Paper) [10555-4] |
| | LASERS AND DIFFRACTIVE OPTICAL ELEMENTS I |
| 10555 05 | Holographic zoom system based on spatial light modulator and liquid device (Invited Paper) [10555-5] |
| 10555 08 | Wide-field-of-view nanoscale Bragg liquid crystal polarization gratings (Invited Paper) [10555-53] |
| | NEW MATERIALS AND EFFECTS |
| 10555 0A | Numerical calculation of Kossel diagrams of cholesteric blue phases (Invited Paper) [10555-9] |
| 10555 OB | Low-voltage tunable color in full visible region using ferroelectric liquid-crystal-doped cholesteric liquid-crystal smart materials (Invited Paper) [10555-10] |
| 10555 0D | Three-dimensional x-ray crystal structure analysis of solution-processed oriented thin film utilizing liquid-crystalline phthalocyanine (Invited Paper) [10555-12] |
| 10555 0G | Optical filter based on Fabry-Perot structure using a suspension of goethite nanoparticles as electro-optic material (Invited Paper) [10555-15] |
| | LASERS AND DIFFRACTIVE OPTICAL ELEMENTS II |
| 10555 OI | Self-addressed diffractive lens schemes for the characterization of LCoS displays [10555-17] |

POLYMERS AND LC COMPOSITES Polymerization speed and diffractive experiments in polymer network LC test cells 10555 ON (Invited Paper) [10555-22] 10555 0O Advancing flexible volatile compound sensors using liquid crystals encapsulated in polymer fibers (Invited Paper) [10555-23] SPATIAL LIGHT MODULATORS AND OPTICAL FILTERS 10555 OS Recent advances in liquid-crystal THz filters (Invited Paper) [10555-26] 10555 OT Quasi-optic millimeter-wave device application of liquid crystal material by using porous PMMA matrix (Invited Paper) [10555-27] PHOTORESPONSIVE, PHOTO-PATTERNING, AND PHOTOALIGNMENT 10555 07 Electric-field effects in the twist-bend nematic phase (Invited Paper) [10555-35] 3D AND AR/VR DISPLAYS 10555 10 Advanced multiplanar volumetric 3D display (Invited Paper) [10555-36] 10555 11 Display technologies for augmented reality (Invited Paper) [10555-37] 10555 12 Liquid crystal true 3D displays for augmented reality applications (Invited Paper) [10555-38] **EMERGING TECHNOLOGIES AND DISPLAYS** 10555 14 Thickness dependence of forming single crystal by liquid-crystalline blue phase on chemically patterned surface (Invited Paper) [10555-40] 10555 15 High-reflective colorful films fabricated by all-solid multi-layer cholesteric structures (Invited Paper) [10555-41] 10555 16 Smart window using a thermally and optically switchable liquid crystal cell (Invited Paper) [10555-42] 10555 17 In-plane only retardation switching by certain type of smectic liquid crystal panels (Invited Paper) [10555-43] 10555 18 Cholesteric metronomes with flexoelectrically programmable amplitude [10555-44]

POSTER SESSION

| 10555 1A | Method of preparing a tunable-focus liquid-crystal (LC) lens [10555-46] |
|----------|---|
| 10555 1B | Electric field switched surface topography of fingerprint liquid-crystal network polymer coating [10555-47] |
| 10555 1E | Control of haze value using electrically switchable liquid crystal phase grating devices [10555-50] |
| 10555 1F | Electromagnetic response of dielectric nanostructures in liquid crystals [10555-51] |
| 10555 1H | Chirality transfer technique between liquid crystal microdroplets using microfluidic systems [10555-54] |