PROCEEDINGS OF SPIE

SPIDigitalLibrary.org/conference-proceedings-of-spie

Front Matter: Volume 8114

, "Front Matter: Volume 8114," Proc. SPIE 8114, Liquid Crystals XV, 811401
(27 September 2011); doi: 10.1117/12.912643

Event: SPIE Photonic Devices + Applications, 2011, San Diego, California,
United States

PROCEEDINGS OF SPIE

Liquid Crystals XV

Iam Choon Khoo

Editor

21–22 August 2011

San Diego, California, United States

Sponsored and Published by
SPIE

Volume 8114

Proceedings of SPIE, 0277-786X, v. 8114

SPIE is an international society advancing an interdisciplinary approach to the science and application of light.

The papers included 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. The papers published in these proceedings 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 this book:

Author(s), "Title of Paper," in *Liquid Crystals XV*, edited by Iam Choon Khoo, Proceedings of SPIE Vol. 8114 (SPIE, Bellingham, WA, 2011) Article CID Number.

ISSN 0277-786X

ISBN 9780819487247

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 © 2011, 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/11/\$18.00.

Printed in the United States of America.

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

SPIDigitalLibrary.org

Paper Numbering: Proceedings of SPIE follow an e-First publication model, with papers published first online and then in print and on CD-ROM. Papers are published as they are submitted and meet publication criteria. A unique, consistent, permanent citation identifier (CID) number is assigned to each article at the time of the first 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, print, and electronic versions of the publication. SPIE uses a six-digit CID article numbering system in which:

- The first four 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. The complete citation is used on the first page, and an abbreviated version on subsequent pages. Numbers in the index correspond to the last two digits of the six-digit CID number.

Contents

vii *Conference Committee*

SESSION 1 NOVEL LIQUID CRYSTALLINE MATERIALS

- 8114 02 **A combined study of mesomorphism, optical, and electronic properties of donor-acceptor columnar liquid crystals (Invited Paper)** [8114-01]
S. H. Eichhorn, S. Chen, M. Ahmida, A. Demenev, H. Kayal, Univ. of Windsor (Canada); F. S. Raad, Univ. of Windsor (Canada) and American Univ. of Beirut (Lebanon); B. R. Kaafarani, American Univ. of Beirut (Lebanon); S. Patwardhan, F. C. Grozema, L. D. A. Siebbeles, Technische Univ. Delft (Netherlands); T. Taerum, D. F. Perepichka, McGill Univ. (Canada); R. Klenkler, Xerox Research Ctr. Canada (Canada)
- 8114 03 **Confined blue phases: trapping of colloidal particles in disclination superstructures (Invited Paper)** [8114-02]
S. Žumer, Univ. of Ljubljana (Slovenia), Jozef Stefan Institute (Slovenia), and Ctr. of Excellence NAMASTE (Slovenia); M. Ravnik, Univ. of Oxford (United Kingdom); J. Fukuda, National Institute of Advanced Industrial Science and Technology (Japan), Univ. of Ljubljana (Slovenia), and Ctr. of Excellence NAMASTE (Slovenia)
- 8114 04 **Nanoparticle-doped isotropic liquid crystals** [8114-17]
A. Parfenov, X. Xia, A. Shapoury, E. A. DeHoog, F. Zhang, S. Pradhan, T. M. Aye, M.-Y. Shih, Physical Optics Corp. (United States); A. Z. Hall, T. M. Cooper, Air Force Research Lab. (United States)

SESSION 2 LIQUID CRYSTAL MODULATORS, SOLITONS, WAVEGUIDES

- 8114 06 **Spatial optical soliton used as a spectral probe in colloids of liquids crystals and nanoparticles (Invited Paper)** [8114-05]
J. F. Henninot, J. F. Blach, M. Warenghem, Univ. Lille Nord de France (France), USTL (France) and UMR 8181, CNRS (France), and Univ. d'Artois (France)

SESSION 3 SURFACES, ANCHORING AND SAGNAC EFFECTS

- 8114 0A **Molecularly oriented surface relief formation and multi-directionally oriented crossed gratings in photoreactive liquid crystalline copolymer films (Invited Paper)** [8114-09]
N. Kawatsuki, A. Tashima, M. Kondo, Univ. of Hyogo (Japan); H. Ono, A. Emoto, Nagaoka Univ. of Technology (Japan); M. Okada, S. Matsui, Univ. of Hyogo (Japan)
- 8114 0C **Anchoring strength of o-, m-, and p-methyl red-dye-doped nematics on rubbed and unrubbed polyimide surfaces** [8114-11]
D. Statman, K. Wozniak, M. Potuzko, Allegheny College (United States)
- 8114 0D **Monitoring anchoring energy in LC-based sensors (Invited Paper)** [8114-12]
R. G. Lindquist, Y. Zou, J. Namkung, D. Ke, The Univ. of Alabama in Huntsville (United States)

SESSION 4 NANO-AND PLASMONIC LIQUID CRYSTALS

- 8114 0G **Toward cloaking in nanosphere dispersed liquid crystal (NDLC) metamaterial (Invited Paper)** [8114-15]
G. Pawlik, W. Salejda, K. Tarnowski, W. T. Walasik, A. C. Mitus, Wroclaw Univ. of Technology (Poland); I. C. Khoo, The Pennsylvania State Univ. (United States)
- 8114 0H **Nanomaterials dispersed in ferroelectric liquid crystals (Invited Paper)** [8114-16]
W. Haase, A. Lapanik, M. Ottinger, Technische Univ. Darmstadt (Germany)
- 8114 0I **Metallic subentities embedded in micro-periodic composite structure** [8114-03]
L. De Sio, R. Caputo, U. Cataldi, Univ. of Calabria (Italy); J. Dintinger, H. Sellame, T. Scharf, Ecole Polytechnique Fédérale de Lausanne (Switzerland); C. Umeton, Univ. of Calabria (Italy)

SESSION 5 NONLINEAR-, ELECTRO-OPTICS AND SWITCHING

- 8114 0J **Photochemical on-off switching of structural color of a multi-bilayered film consisting of azobenzene-polymer liquid crystal and polyvinylalcohol (Invited Paper)** [8114-18]
S. Kurihara, M. Moritsugu, Y. Kuwahara, T. Ogata, Kumamoto Univ. (Japan)
- 8114 0K **Optofluidics based on liquid crystal microflows (Invited Paper)** [8114-19]
A. E. Vasdekis, J. G. Cuennet, Ecole Polytechnique Fédérale de Lausanne (Switzerland); L. De Sio, National Institute for the Physics of Matter, CNR, Univ. of Calabria (Italy); D. Psaltis, Ecole Polytechnique Fédérale de Lausanne (Switzerland)
- 8114 0M **Simple and functional photonic devices from printable liquid crystal lasers** [8114-21]
D. J. Gardiner, P. J. W. Hands, S. M. Morris, T. D. Wilkinson, H. J. Coles, Univ. of Cambridge (United Kingdom)

SESSION 6 NOVEL LIQUID CRYSTALS AND PHOTONIC DEVICES I

- 8114 0O **Diffuse cone behavior and microscopic structure of the de Vries smectic-A and smectic-C phases (Invited Paper)** [8114-23]
H. Yoon, D. M. Agra-Kooijman, Kent State Univ. (United States); K. Ayub, COMSATS Institute of Information Technology (Pakistan); R. P. Lemieux, Queen's Univ. (Canada); S. Kumar, Kent State Univ. (United States)
- 8114 0P **Liquid crystal beam shaping devices employing patterned photoalignment layers for high-peak-power laser applications (Invited Paper)** [8114-24]
K. L. Marshall, S. K.-H. Wei, M. Vargas, K. Wegman, C. Dorrer, P. Leung, J. Boule III, Z. Zhao, S. H. Chen, Univ. of Rochester (United States)

SESSION 7 NOVEL LIQUID CRYSTALS AND PHOTONIC DEVICES II

- 8114 0S **Liquid crystal molecular orientation properties of microrubbing cells and its application to electrically tunable grating** [8114-27]
M. Honma, W. Toyoshima, T. Nose, Akita Prefectural Univ. (Japan)

- 8114 OT **Wavelength-tuneable liquid crystal lasers from the visible to the near-infrared** [8114-28]
P. J. W. Hands, C. A. Dobson, S. M. Morris, M. M. Qasim, D. J. Gardiner, T. D. Wilkinson,
H. J. Coles, Univ. of Cambridge (United Kingdom)
- 8114 OV **Waveguides with liquid crystals (Invited Paper)** [8114-30]
K. Neyts, T. Ako, W. De Cort, P. Vanbrabant, J. Beeckman, Univ. Gent (Belgium)

SESSION 8 NOVEL LIQUID CRYSTALS

- 8114 OW **Universal soft matter template: from photonic to metamaterial applications (Invited Paper)**
[8114-07]
C. Umeton, L. De Sio, R. Caputo, S. Ferjani, Univ. of Calabria (Italy); G. Strangi, Liquid Crystal
Lab., CNR, Univ. of Calabria (Italy) and Univ. of Calabria (Italy); R. Bartolino, Univ. of
Calabria (Italy)
- 8114 OX **Design and synthesis of an achiral ferroelectric smectic liquid crystal (Invited Paper)**
[8114-31]
E. Korblova, D. M. Walba, T. Gong, Univ. of Colorado at Boulder (United States); A. Reddy,
PPG Industries (United States); C. Zhu, R. Shao, J. E. MacLennan, M. A. Glaser, N. A. Clark,
Univ. of Colorado at Boulder (United States)

POSTER SESSION

- 8114 12 **Tunable retarder made of pentaprisms and liquid crystal** [8114-37]
M. Saito, K. Hayashi, Ryukoku Univ. (Japan)
- 8114 13 **Cost-efficient manufacturing process of switchable glazing based on twisted nematic LC
cells** [8114-38]
E. Kurz, L. Rau, N. Frühauf, W. Haase, M. Prskalo, W. Sobek, Univ. Stuttgart (Germany)
- 8114 14 **Waveguide display using polymer-dispersed liquid crystal** [8114-39]
Y.-H. Cheng, G.-D. J. Su, National Taiwan Univ. (Taiwan)
- 8114 15 **Slope efficiency characteristics of mode-hop driven tunable single-mode cholesteric liquid
crystal laser** [8114-40]
Y. Inoue, H. Yoshida, K. Inoue, Y. Shiozaki, H. Kubo, A. Fujii, M. Ozaki, Osaka Univ. (Japan)
- 8114 16 **LCD failure evaluation methods and application to effect of dc drive** [8114-41]
L. Lu, Kent State Univ. (United States); A. Alagh, Okaya Electric America, Inc. (United States);
P. J. Bos, Kent State Univ. (United States)
- 8114 17 **Polarization twisted nematic gratings: a study of the far field diffraction pattern** [8114-42]
D. Statman, R. Pettit, J. Stenger, Allegheny College (United States)
- 8114 18 **Study of cholesteric liquid crystal-rhodamine 6G doped polymethyl methacrylate thin film
cholesteric liquid crystal system** [8114-43]
R. B. Alaverdyan, T. K. Dadalyan, N. A. Hayrapetyan, Yerevan State Univ. (Armenia)

- 8114 19 **Optically switchable photoluminescence using liquid-crystal dispersed quantum dots in film and capillary tube** [8114-44]
M.-C. Cheng, Y.-C. Su, V. K. S. Hsiao, National Chi Nan Univ. (Taiwan)

Author Index

Conference Committee

Symposium Chair

Zakya H. Kafafi, National Science Foundation (United States)

Conference Chair

Iam Choon Khoo, The Pennsylvania State University (United States)

Program Committee

Timothy J. Bunning, Air Force Research Laboratory (United States)

Shaw-Horng Chen, University of Rochester (United States)

Neil Collings, University of Cambridge (United Kingdom)

Jean-Pierre Huignard, Jphopto (France)

Tomiki Ikeda, Tokyo Institute of Technology (Japan)

Oleg D. Lavrentovich, Kent State University (United States)

Francesco F. Simoni, Università Politecnica delle Marche (Italy)

David M. Walba, University of Colorado at Boulder (United States)

Session Chairs

- 1 Novel Liquid Crystalline Materials
Iam Choon Khoo, The Pennsylvania State University (United States)
- 2 Liquid Crystal Modulators, Solitons, Waveguides
Kenneth L. Marshall, University of Rochester (United States)
- 3 Surfaces, Anchoring, and Sagnac Effects
Tomiki Ikeda, Tokyo Institute of Technology (Japan)
- 4 Nano- and Plasmonic Liquid Crystals
Timothy J. Bunning, Air Force Research Laboratory (United States)
- 5 Nonlinear-, Electro-Optics, and Switching
Kenneth L. Marshall, University of Rochester (United States)
- 6 Novel Liquid Crystals and Photonic Devices I
Iam Choon Khoo, The Pennsylvania State University (United States)

- 7 Novel Liquid Crystals and Photonic Devices II
Iam Choon Khoo, The Pennsylvania State University (United States)
- 8 Novel Liquid Crystals
Timothy J. Bunning, Air Force Research Laboratory (United States)