

PROCEEDINGS OF SPIE

Pacific-Rim Laser Damage 2018

Optical Materials for High-Power Lasers

Takahisa Jitsuno
Jianda Shao
Wolfgang Rudolph
Editors

24–27 April 2018
Yokohama, Japan

Sponsored by
SPIE

Organized by
Institute of Laser Engineering, Osaka University (Japan)
SIOM—Shanghai Institute of Optics and Fine Mechanics (China)

Cooperating Organizations
Institute for Laser Technology (Japan)
Laser Society of Japan
Japan Laser Processing Society

Published by
SPIE

Volume 10713

Proceedings of SPIE 0277-786X, V. 10713

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

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 SPIDigitalLibrary.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 *Pacific-Rim Laser Damage 2018: Optical Materials for High-Power Lasers*, edited by Takahisa Jitsuno, Jianda Shao, Wolfgang Rudolph, Proceedings of SPIE Vol. 10713 (SPIE, Bellingham, WA, 2018) Seven-digit Article CID Number.

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510619920

ISBN: 9781510619937 (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

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

SPIE. DIGITAL LIBRARY

SPIDigitalLibrary.org

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

v	<i>Authors</i>
vii	<i>Conference Committee</i>
ix	<i>Introduction</i>

SLPC-PLD-LIC1: JOINT SESSION II

10713 03	UV-induced aging leading to laser damage in the bulk of fused silica (Invited Paper) [10713-2]
----------	---

HIGH-POWER LASER DAMAGE I

10713 04	Toward “defect-free” optics: a pioneering comprehensive metrology method (Invited Paper) [10713-3]
10713 06	Comparison of 355-nm nanosecond and 1064-nm picosecond laser induced damage in high-reflective coatings [10713-5]

HIGH-POWER LASER DAMAGE II

10713 09	Effect of micro-crack and reaction product on laser damage performance of optical glass during chemical etching [10713-8]
10713 0A	Strategies for improving the laser-induced damage thresholds of dichroic coatings developed for high-transmission at 527 nm and high reflection at 1054 nm [10713-9]
10713 0B	Improving the environmental stability of e-beam coatings by employing a PIAD capping layer (Invited Paper) [10713-10]

DEFECTS AND DUV

10713 0F	Transmissivity testing of calcium fluoride windows under high pulse repetition rate laser irradiation at 193 nm [10713-14]
----------	---

LASER MATERIALS

10713 0J	Highly efficient Ho:KY(WO₄)₂ thin-disk lasers at 2.06 μm (Invited Paper) [10713-18]
----------	--

SHORT-PULSE LASERS

- 10713 0U **Laser damage metrology in the sub-ps range for the PETAL facility (Invited Paper)** [10713-29]
- 10713 0W **Generation of few-cycle millijoule pulses at 5 μm employing a ZnGeP₂-based OPCPA pumped with GW peak power pulses at 2 μm (Invited Paper)** [10713-31]

DAMAGE MEASUREMENT AND DEFECTS

- 10713 11 **Shape dependence of downstream light intensification caused by flaws** [10713-37]
- 10713 12 **Combined modulation to incident laser by subsurface crack and contaminant on fused silica** [10713-38]

POSTER SESSION

- 10713 1F **Non-invasive and in situ measurement of a refractive index gradient profile of one-dimensional GRIN materials** [10713-51]
- 10713 1M **Quasi-CW laser-induced damage of indium tin oxide films and polyimide films at 1064 nm wavelength** [10713-58]