PROCEEDINGS OF SPIE

Fiber Lasers and Glass Photonics: Materials through Applications III

Maurizio Ferrari Angela B. Seddon Stefano Taccheo Editors

3–7 April 2022 Strasbourg, France

9–20 May 2022 ONLINE

Sponsored by SPIE

Cosponsored by
City of Strasbourg (France)
IdEx University of Strasbourg (France)
CNRS (France)
iCube (France)
Université de Strasbourg (France)

Cooperating Organisations
Photonics 21 (Germany)
EOS—European Optical Society (Germany)
Photonics Public Private Partnership (Belgium)
Photonics France (France)

Published by SPIE

Volume 12142

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 Fiber Lasers and Glass Photonics: Materials through Applications III, edited by Maurizio Ferrari, Angela B. Seddon, Stefano Taccheo, Proc. of SPIE 12142, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510651609

ISBN: 9781510651616 (electronic)

Published by

SPIE

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

SPIE.org

Copyright © 2022 Society of Photo-Optical Instrumentation Engineers (SPIE).

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 fees. To obtain permission to use and share articles in this volume, visit Copyright Clearance Center 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.

Printed in the United States of America by Curran Associates, Inc., under license from SPIE.

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



Paper Numbering: A unique citation identifier (CID) number is assigned to each article in the Proceedings of SPIE 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

ix Conference Committee

	MATERIALS AND COMPONENTS I: NANOCRYSTALS, NANOPARTICLES, AND PLASMONICS
12142 02	Glass powder doping of nanocrystal-doped fibres: challenges and results (Invited Paper) [12142-1]
12142 03	Planar and rectangular ceramic Yb:YAG laser waveguides [12142-3]
12142 04	Exploiting surface plasmon resonance for integrated optics [12142-4]
	MATERIALS AND COMPONENTS II: FILMS, NOVEL CONCEPTS, AND PROCESSES
12142 05	Tungsten oxide films for near-infrared photonics and sensing (Invited Paper) [12142-7]
12142 06	RF-sputtering fabrication of flexible glass-based 1D photonic crystals [12142-9]
12142 07	Gas sensing using xerogel coated whispering gallery mode resonators [12142-10]
12142 08	SiO ₂ -TiO ₂ hybrid coatings applied on polymeric materials for flexible photonics applications [12142-11]
	SPECIAL SESSION HONORING ANNE-MARIE JURDYC: EARLY STAGE RESEARCHERS AND WOMAN SCIENTISTS
12142 09	Double-doped borate glass light guide with high luminance [12142-13]
	SPECIAL SESSION ON THE INTERNATIONAL YEAR OF GLASS I
12142 OB	Alkali-germanate glass-ceramics doped with manganese and chromium ions [12142-18]

	SPECIAL SESSION ON THE INTERNATIONAL YEAR OF GLASS II
12142 0C	Spectral properties of cesium lead iodide perovskite nanocrystals in borogermanate glass at different temperatures [12142-22]
12142 0D	Shaping nanoparticles in optical fibers through thermal engineering [12142-23]
	SPECIAL SESSION HONORING ANTONIO LUCIANETTI. MATERIALS AND COMPONENTS III: FIBERS, COMPONENTS, FABRICATION, AND PROPERTIES
12142 OE	Tellurite-germanate ZnTe: glass-ceramics doped with EuF_3 for optical fiber application [12142-27]
12142 OF	High power laser-induced damage investigations of mirrors with several substrate materials in combination with heat transfer simulations [12142-28]
12142 0G	Investigation of NIR emission in Yb³+/Er³+ - doped fluoroindate glasses for optical fiber application $[12142-38]$
	MATERIALS AND COMPONENTS IV: SOURCES
12142 OH	Laser gain characterization and CW laser operation in Nd:CaF2 co-doped with Gd3+ and Y3+ buffer ions $[12142\text{-}33]$
	MATERIALS AND COMPONENTS V: ACTIVE MATERIALS AND GLASS CERAMICS
12142 OI	Spectroscopy of Ho ³⁺ -doped fluoride glasses for green double-clad fiber lasers [12142-35]
12142 OJ	Synthesis and mid-infrared luminescence of "mixed" Er:(Lu,Y,La) $_2$ O $_3$ transparent ceramic [12142-36]
	MID-INFRARED LASER SOURCES: SPECIAL SESSION
12142 OK	High-power middle IR and long-wave IR frequency comb generators based on mode-locked polycrystalline Cr:ZnS lasers (Invited Paper) [12142-43]
12142 OL	Growth and spectroscopy of Er³+-doped Na ₅ Y ₉ F ₃₂ (5NaF·9YF³) crystal [12142-46]
12142 OM	Large mode area fibers for single-mode transmission near 2µm [12142-48]

	FIBERS AND WAVEGUIDE SOURCES I: TWO-MICRON LASERS
12142 ON	Tunable wavelength-stabilized mode-locked thulium-doped fiber laser beyond 2000 nm [12142-50]
12142 00	2 μm Raman laser based on CO ₂ -filled hollow-core silica fiber (Invited Paper) [12142-51]
	FIBER LASERS, INFRARED, AND VISIBLE LASERS
12142 OP	Study of periodic amplitude fluctuations in a mode-lock Ytterbium fiber laser delivering 1 MHz pulse train [12142-55]
12142 0Q	Quasi-CW and pulsed generation in coupled Raman fiber lasers with PT symmetry [12142-57]
	FIBERS AND WAVEGUIDE SOURCES II: FIBERS AND MATERIALS
12142 OR	Laser-induced damages in silica multimode optical fibers [12142-62]
12142 OS	Er-doped tapered fiber amplifier for high peak power sub-ns pulse amplification [12142-63]
	APPLICATIONS I
12142 OT	Whispering gallery modes silica resonators: a platform for optical sensing (Invited Paper) [12142-65]
	APPLICATIONS II
12142 OU	Enhancing photocatalysis by means of up-conversion photonics materials for pollutant degradation and hydrogen generation: "bridge the gap" (Invited Paper) [12142-70]
12142 OV	Laser energy delivery method and apparatus using multiple beam interference [12142-71]
12142 OW	lonizing radiation profiling through the induced refractive index change in backscattering-enhanced optical fibers $[12142\text{-}72]$
	FIBER LASERS: NOVEL CONCEPTS
12142 0X	FIBER LASERS: NOVEL CONCEPTS Broadband NIR luminescence in double-core germanate optical fiber (Invited Paper) [12142-74]

12142 OY	Effect of bi-directional excitation and external feedback on the mode structure of distributed-feedback lasers [12142-75]
12142 OZ	Design of an Er ³⁺ : InF ₃ fiber laser pumped with red light [12142-76]
12142 10	Feasibility investigation of Ho: Nd codoped InF3 fibers pumped at 808 nm wavelength [12142-77]
12142 11	Generation of modulation instability-induced high-repetition-rate pulse train with high-phase modulation depth [12142-78]
12142 12	Giant pulse generation in the fibers with inscribed Bragg gratings [12142-79]
	POSTER SESSION
12142 13	Photoluminescence of Er/Yb-doped zinc-silicate glass and glass ceramics with ZnO and Zn ₂ SiO ₄ nanoparticles [$12142-80$]
12142 14	Supermode noise suppression in harmonically mode-locked fiber laser by continuous wave injection [12142-81]
12142 15	Harmonically mode-locked fiber laser with fine repetition rate tuning through continuous wave injection [12142-82]
12142 16	Surface roughness optimization during femtosecond UV laser ablation [12142-83]
12142 17	Evaluation of the uncertainty on phase noise for optoelectronic oscillators [12142-84]
12142 18	Fiber to resonator coupling multicriteria optimization with COMSOL multiphysics [12142-85]
12142 19	Numerical simulations and experimental analysis of scanning techniques for low-roughness surfaces using UV femtosecond pulses [12142-86]
12142 1A	Accuracy of Brillouin frequencies for material characterization by light scattering [12142-87]
12142 1B	Integration of Mach-Zehnder interferometer on optical fiber using UV femtosecond laser pulses [12142-88]
12142 1C	Spectroscopic properties of fluoroindate glass and glass-ceramics doped with Eu ³⁺ ions [12142-89]
12142 1D	Colour tuneable upconversion photonic materials for anti-counterfeiting security inks [12142-90]
12142 1E	High intense UV-blue upconversion luminescence in NaYbF4:Tm³+ based nanostructured materials to boost photocatalysis [12142-91]

12142 1F	Composite ZnO-Yb ₂ O ₃ -Er ₂ O ₃ transparent ceramics: structure and spectral-luminescent properties [12142-93]
12142 1G	Transparent glass-ceramics based on Ti^{3+} -doped $ZnAl_2O_4$ nanocrystals: synthesis, structure and optical properties [12142-94]
12142 1H	SiO ₂ —CaO—ZnO nanoglass as multifunctional material [12142-95]
12142 11	All-fiber high-peak power chirped pulse amplifier based on a triple-cladding fiber for pulse stretching and a highly-Yb-doped pedestal fiber for pulse amplification [12142-96]
12142 1J	Amorphous WO ₃ as transparent conductive oxide in the near-IR [12142-97]
12142 1K	Production of optical waveguide in planar glass substrate fabricated with femtoprint [12142-98]