

# PROCEEDINGS OF SPIE

*Pacific Rim Laser Damage 2015*

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## **Optical Materials for High-Power Lasers**

**Jianda Shao**  
**Takahisa Jitsuno**  
**Wolfgang Rudolph**  
*Editors*

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## Introduction

These proceedings contain the papers presented as oral and poster presentations at the Pacific-Rim Laser Damage 2015, IV Symposium on Optical Materials for High Power Lasers. The symposium was co-organized by SPIE and Shanghai Institute of Optics and Fine Mechanics (SIOM), and was held on 17–20 May in Shanghai. The symposium aims to provide an opportunity for world-wide researchers, especially in the Pacific Rim, to communicate efficiently and to exchange information on new problems, solutions, and technologies in the field of laser damage as well as optical materials.

The symposium brought together more than 130 scientists, engineers and researchers from 13 countries or districts. 92 papers were accepted for presentations, including 54 oral papers and 38 poster papers.

The symposium was divided into nine sessions, including High power laser damage, UV through IR; Laser ablation and laser machining; High laser damage resistant coatings; Defects, contamination, polishing, and surface damage; Characterization techniques and measurement protocols; Mechanisms, modeling, and simulations; Nonlinear laser crystals; Laser ceramics; and Optical glasses and fibers.

This year, the “High Power Laser Damage, UV through IR” sessions received the most submissions among all the topics. Developments in high power laser systems were introduced including high power lasers at KPSI, JAEA (Japan), the high power femtosecond laser at Swinburne University of Technology (Australia), and the CPA/OPCPA hybrid laser system at SIOM (China), allowing the participants to quickly review the recent status of high power laser systems across the world. A significant number of presentations focused on the laser damage resistance of laser components like fused silica, optical fibers, KDP/DKDP crystals, coatings, gratings, and so on. Defects and contamination continue to be an area of active interest. Take optical coatings as an example, defects induced in the substrate, deposition process, as well as during usage, have been reported by groups in SIOM (China), Sandia National Laboratories (United States) and Osaka University (Japan), respectively. Research on the stochastic nature of the growth of laser-induced damage in Lawrence Livermore National Laboratory (United States) was also been presented.

These papers show participants the recent work on laser damage threshold, as well as the damage mechanism of laser materials and laser components. We continue to see interest in laser ablation and laser machining, such as work on glass welding by femtosecond double pulse irradiation performed by a group at RIKEN (Japan), the results of three dimensional nanofabrication presented by groups in Shandong University (China) and University of Nebraska-Lincoln (United States). In addition, a fair amount of papers deal with characterization

techniques and measurement protocols, including the characterization of optical properties and laser induced effects, enabling a better understanding of laser-related measurements.

The Pacific-Rim Laser Damage 2016, V Symposium on Optical Materials for High Power Lasers, will be held on 17–20 May 2016, as a part of OPIC, venue by Pacifico Yokohama (Yokohama, Japan). The principal topics in 2016 will be similar as those mentioned above. We are looking forward to seeing more scientists and engineers from related fields at Pacific-Rim Laser Damage 2016.

We thank SPIE for their hard work on this symposium. We also highly appreciate the International Program Committee, the Local Organizing Committee, and session chairs who have so generously given of their time and advice to make this symposium possible. The symposium would not be possible without the dedicated contribution of our participants and members — thanks to all.

**Jianda Shao**  
**Takahisa Jitsuno**  
**Wolfgang Rudolph**