PROCEEDINGS OF SPIE

SPIDigitalLibrary.org/conference-proceedings-of-spie

Front Matter: Volume 7069

, "Front Matter: Volume 7069," Proc. SPIE 7069, Optical System Contamination: Effects, Measurements, and Control 2008, 706901 (2 October 2008); doi: 10.1117/12.812894

SPIE.

Event: Optical Engineering + Applications, 2008, San Diego, California, United States

PROCEEDINGS OF SPIE

***Optical System Contamination:
Effects, Measurements,
and Control 2008***

Sharon A. Straka

Editor

13–14 August 2008

San Diego, California, USA

Sponsored and Published by
SPIE

Volume 7069

Proceedings of SPIE, 0277-786X, v. 7069

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 *Optical System Contamination: Effects, Measurements, and Control 2008*, edited by Sharon A. Straka, Proceedings of SPIE Vol. 7069 (SPIE, Bellingham, WA, 2008) Article CID Number.

ISSN 0277-786X

ISBN 9780819472892

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 © 2008, 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/08/\$18.00.

Printed in the United States of America.

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

SPIEDigitalLibrary.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 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 CONTAMINATION EFFECTS I

- 7069 02 **Minimizing contamination to multilayer dielectric diffraction gratings within a large vacuum system** [7069-01]
B. Ashe, K. L. Marshall, D. Mastrosimone, C. McAtee, Univ. of Rochester (United States)
- 7069 03 **Photochemical processes in a two-component molecular contaminant film** [7069-02]
K. T. Luey, D. J. Coleman, The Aerospace Corp. (United States)
- 7069 04 **Optical characterization of condensed and photofixed RTV effluent** [7069-03]
N. J. Ianno, D. W. Thompson, Univ. of Nebraska, Lincoln (United States)
- 7069 05 **Effects of vacuum-ultraviolet radiation on the desorption of molecular contaminants** [7069-04]
K. R. Olson, K. A. Folgner, G. K. Ternet, The Aerospace Corp. (United States)
- 7069 06 **Chemical analysis of silicone outgassing** [7069-05]
R. M. Villahermosa, A. D. Ostrowski, The Aerospace Corp. (United States)

SESSION 2 CONTAMINATION EFFECTS II

- 7069 07 **Particulate infiltration into a simulated space telescope** [7069-06]
D.-L. Liu, K. T. Luey, The Aerospace Corp. (United States)
- 7069 08 **Managing Contamination-enhanced Laser Induced Damage (CLID)** [7069-07]
R. M. Villahermosa, B. H. Weiller, S. Virji, D. P. Taylor, The Aerospace Corp. (United States)

SESSION 3 ANTI-CONTAMINATION/PROTECTIVE COATINGS

- 7069 09 **Mitigating molecular and particulate contamination via surface energy** [7069-09]
M. S. Crowder, C. Haley, Ball Aerospace & Technology Corp. (United States)
- 7069 0A **Characterizing the optical performance of AZ93 with a fluoropolymer overcoat under ultraviolet exposure** [7069-10]
A. Y. Huang, W. D. Schmidl, C. E. Soares, The Boeing Co. (United States)
- 7069 0B **Self-cleaning and anti-contamination coatings for space exploration: an overview** [7069-11]
R. Pirich, J. Weir, D. Leyble, Northrop Grumman Integrated Systems (United States)

- 7069 0C **Modified polymers for contamination sensing and prevention of optical and space systems** [7069-12]
S. R. Halper, R. M. Villahermosa, The Aerospace Corp. (United States)

SESSION 4 CONTAMINATION ANALYSES/SPACE ENVIRONMENTS

- 7069 0E **Degradation of solar cell optical performance due to plume particle pitting** [7069-14]
W. Schmidl, K. Smith, C. Soares, C. Steagall, C. G. Shaw, The Boeing Co. (United States)
- 7069 0F **Molecular-transport modeling using direct simulation Monte Carlo methods for use in analyzing spacecraft and spacecraft instruments** [7069-15]
B. Matheson, Ball Aerospace & Technologies Corp. (United States); J. Hueser, Aeroscience Consultants Corp. (United States)
- 7069 0G **Modeling of volatile contamination transport for surface operations of the Mars Science Laboratory** [7069-16]
B. Blakkolb, I. Katz, I. Mikellides, Jet Propulsion Lab. (United States)

SESSION 5 CONTAMINATION CONTROL, MONITORING AND VERIFICATION

- 7069 0H **Examining water vapor content for purging critical space systems** [7069-18]
C. W. Chang, J. D. Bush, R. R. Peabody, Lockheed Martin Space Systems Co. (United States)
- 7069 0I **A comparison of two identical SAW devices** [7069-19]
J. T. Sanders, ATK Space Systems (United States)
- 7069 0J **Contamination effects and requirements derivation for the James Webb Space Telescope** [7069-20]
E. Wooldridge, NASA Goddard Space Flight Ctr. (United States); J. Arenberg, Northrop Grumman Space Technology (United States)

SESSION 6 STRAY LIGHT IN OPTICAL SYSTEMS

- 7069 0K **Data reduction of BSDF measurements from curved surfaces** [7069-22]
E. C. Fest, Raytheon Missile Systems (United States)
- 7069 0L **Stray light analysis of SALEX instrument** [7069-23]
S. J. Ham, Yonsei Univ. (Korea, Republic of) and Rutherford Appleton Lab. (United Kingdom); H. Lee, Rutherford Appleton Lab. (United Kingdom) and Univ. of Oxford (United Kingdom); J.-M. Lee, S.-W. Kim, Yonsei Univ. (Korea, Republic of); T. Richards, M. Lockwood, Rutherford Appleton Lab. (United Kingdom)
- 7069 0M **Stray light test station for measuring point source transmission and thermal background of visible and infrared sensors** [7069-24]
G. L. Peterson, Breault Research Organization (United States)

7069 00

New stray light test facility and initial results [7069-26]

J. Fleming, F. Grochocki, T. Finch, S. Willis, P. Kaptchen, Ball Aerospace & Technologies Corp. (United States)

Author Index

Conference Committee

Program Track Chair

José M. Sasian, College of Optical Sciences, The University of Arizona
(United States)

Conference Chair

Sharon A. Straka, NASA Goddard Space Flight Center (United States)

Conference Cochair

Nancy Carosso, SGT, Inc. (United States)

Session Chairs

- 1 Contamination Effects I
David P. Taylor, The Aerospace Corporation (United States)
- 2 Contamination Effects II
Mark T. Boies, Research Support Instruments, Inc. (United States)
- 3 Anti-Contamination/Protective Coatings
Wanda C. Peters, NASA Goddard Space Flight Center (United States)
- 4 Contamination Analyses/Space Environments
Eve M. Wooldridge, NASA Goddard Space Flight Center (United States)
- 5 Contamination Control, Monitoring and Verification
Mark S. Crowder, Ball Aerospace & Technologies Corporation (United States)
- 6 Stray Light in Optical Systems
Richard N. Pfisterer, Photon Engineering LLC (United States)
John C. Fleming, Ball Aerospace & Technologies Corporation (United States)