

CONTENTS

GENERAL REVIEWS

- Plasma Physics Basic Science and Technology**
J. M. Dawson and S. Sharafat (UCLA) 1

- Recent Advancements and Opportunities in Plasma Spray Technology**
M. F. Smith (Sandia National Labs.) 9

- The Hardening of Surfaces with Plasma and Directed Energy Beams**
A. J. Perry (A.I.M.S. Marketing) and
J. N. Matossian (Hughes Research Labs.) 17

PLASMA SOURCES

Properties

- Effect of Magnetic Fields on a DC Arcjet Thruster**
K. Toyoda and Y. Arakawa (University of Tokyo) 25

- Radiation Power of High Pressure SF₆ Arc Plasma**
T. Matsumura, Y. Yokomizu, and W. Y. Sun
(Nagoya University) 31

- Plasma Problems in Semiconductor Fabrication**
F. F. Chen (UCLA) 37

Modeling

- Dual Frequency Plasma Simulation with a Three Moment Model**
H. C. Kim and V. I. Manousiouthakis (UCLA) 39

- Jet Impingement Effects on Material Surface**
A. K. Hayashi and O. Yonemura (Aoyama Gakuin University) 47

Equipment

- Development of a 5-Axis Robotic System for Thermal Spray Applications**
R. Elias, C. M. I. Camago, N. M. Ghoniem,
D. C. H. Yang, and S. Sharafat (UCLA) 53

PLASMA APPLICATIONS**Plasma Spray****Application Feasibility of Plasma Electrode Type Plasma Spray Gun**

K. Osaki, H. Asida, O. Fukumasa, N. Tada (Yamaguchi Univ.),
A. Kobayashi (Osaka Univ.) 61

Analytical and Numerical Modeling of Liquid-Metal Droplet Impact, Spreading, and Solidification

R. H. Rangel and J.-P. Delplanque (UCI) 67

Numerical Simulation of Plasma Heating of Powder Particles

M. D. Demetriou, A. S. Lavine, and N. M. Ghoniem (UCLA) 75

Deposition**Plasma Source Ion Implantation to Increase the Adhesion of Subsequently Deposited Coatings**

B. P. Wood, K. C. Walter,
T. N. Taylor (Los Alamos National Lab.) 83

Surface Nitriding of Titanium Materials by Means of Gas Tunnel Type Plasma Jet

A. Kobayashi (Osaka University) 91

Surface Cleaning**Roughening and Removal of Surface Contamination from Beryllium Using Negative Transferred-Arc Cleaning**

R. G. Castro, K. J. Hollis, and K. E. Elliott
(Los Alamos National Lab.) 99

Thermal Testing**Hydrogen Based High-Heat-Flux Experiments for the Thermophysical Optimization of Actively Cooled Plasma Facing Components**

W. Hohenauer, J. Linke, and R. Uhlemann (Julich GmbH) 107

Ozone Production**Applications of Atmospheric Glow Discharge Plasma**

C. Yamabe, K. Hakai, and N. Taniguchi (Saga University) 115

ADVANCED MATERIALS AND CHARACTERIZATION**Advanced Materials****Formation and Physical Properties of Ti Base Alloys by Sputtering**

M. Naka, T. Shibayanagi, M. Maede (Osaka University),
Y. Ogata (Kyoto University) 123

In-Situ Synthesis of Fully Dense MoSi₂-SiC Composites by Spark Plasma Sintering

K. Kurokawa, M. Ube, and H. Takahashi (Hokkaido University) 129

Nucleation of Nano-Phase Atomic Clusters within a Plasma: Models and Experiment

G. A. Johnson, R. S. Shaefer, N. M. Ghoniem,
G. A. Tynan (UCLA) 135

Characterization**YAG Laser Welding of Stainless Steel Helium-Doped by Means of Helium Implanting Technique**

T. Kuroda (Osaka University) 143

R-Curve Measurements in Ceramics by Means of Indentation Strength-in-Bending Method

N. Miyata and T. Suzuki (Kyoto University) 151

Characterizing Basic Interfacial Adhesion in Thin Structures with Applications to Thermal Barrier Coatings

V. Gupta, A. Yu, and J. Wu (UCLA) 159

HIGH ENERGY PROCESSING AND OTHERS**Ion Beam Processing****Surface Characterization by Intense Pulsed Ion Beams**

M. Yatsuzuka (Himeji Inst. of Tech.),
Y. Hashimoto (Kobe City Col. of Tech.),
T. Yamasaki, and H. Uchida (Himeji Inst. of Tech.) 165

Sputter Deposition**An Atomistic Simulator for Sputter Deposition in Three-Dimensional Spaces**

H. Huang, T. D. de la Rubia (Lawrence Livermore National Lab.),
G. Gilmer (Bell Labs.) 173

Thermal spraying

**Some Properties of Flame Sprayed Metal Coatings with
Electrolytic Arc Heating**

J. Morimoto, A. Yamaguchi (Kinki University),
A. Kobayashi (Osaka University) 179

Hybrid Microwave D. C. Plasma Arc Thermal Spraying

T. Meek (University of Tennessee) and
M. F. Smith (Sandia National Labs.) 185

Additional

**Characterization of a High Power RF Plasma Dissociator
at Atmospheric Pressure for Processing of Hazardous Waste**

A. Y. Wong, W. Huhn, R. Dickman, G. Rosenthal,
K. D. Kang (UCLA) 191

Author Index

..... 197