Diamond Electronics and Biotechnology—Fundamentals to Applications V
CONTENTS

Preface ................................................................. ix

Materials Research Society Symposium Proceedings ............... xi

* Recent Progress in Diamond Raman Lasers ...................... 1
  Richard P. Mildren

  Dopant Uniformity and Concentration in Boron Doped Single
  Crystal Diamond Films ....................................... 13
  Shannon N. Demlow, I. Berkun,
  M. Becker, T. Hogan, and T.A. Grotjohn

  Electrochemical Oxidation of Phenol in Water Solutions
  Using Nanocrystalline Boron-Doped Diamond Film Anode .... 21
  Jorge Arturo Lara Viera, Manoj K. Ram,
  Pedro Villalba, Mikhail Ladanov,
  and Ashok Kumar

  Fabrication of Diamond Nanopit Arrays by Room-temperature
  Curing Nanoimprint Lithography Using Glass-like Carbon Molds . . . 27
  Shuji Kiyohara, Chigaya Ito, Ippei Ishikawa,
  Hiroyumi Takikawa, Yoshio Taguchi,
  Yoshinari Sugiyama, Yukiko Omata,
  and Yuichi Kurashima

  Micro-organic Light-emitting Devices Fabricated
  by Room-temperature Curing Nanoimprint Lithography
  Using Diamond Molds ......................................... 33
  Ippei Ishikawa, Taisuke Okuno, Shuji Kiyohara,
  Yoshio Taguchi, Yoshinari Sugiyama,
  Yukiko Omata, and Yuichi Kurashima

  Influence of the Doping Level at Boron Doped Nanocrystalline
  Diamond Films in the Electrochemical Determination of Nitrite . . . 39
  Jorge T. Matsushima, Diego H.L. Souza,
  Fernando A. Souza, Adriana F. Azevedo,
  Mauricio R. Baldan, and Neidenei G. Ferreira

*Invited Paper
Copper Photoelectrodeposition onto Boron Doped Diamond Electrodes at Different Doping Level to Enhance Nitrate Electroreduction ........................................... 45
A.B. Couto, M.R. Baldan, and N.G. Ferreira

Field Emission Mechanism of H-Terminated N-Type Diamond NEA Surface ....................................... 51
Takatoshi Yamada, Masataka Hasegawa, Hisato Yamaguchi, Yuki Kudo, Ken Okano, and Christoph E. Nebel

The Influence of Boron Doping in the Growth of Ultra/Nanocrystalline Diamond Films ........................................... 57
Fernando A. Souza, Adriana F. Azevedo, Maurício R. Baldan, and Neidenêní G. Ferreira

Anodic and Cathodic Pre-treatment Effects on BDD Surface to Deposit Copper Nanoparticles Applied to Nitrate Reduction ............. 63

Roles of Boron in Growth of Diamond Grains in Ultrananocrystalline Diamond/Hydrogenated Amorphous Carbon Composite Films Prepared by Pulsed Laser Deposition .............. 69
Shinya Ohmagari, Yuki Katamune, Hikaru Ichinose, and Tsuyoshi Yoshitake

Enhanced Wettability of Nanocrystalline Diamond Films for Biocoating Applications ..................................... 75
Jason H.C. Yang and Kungen Teii

Comparative Electrode Kinetics of Micro and Nano-crystalline Boron Doped Diamond ........................................... 81
E. Saito, A.F. Azevedo, F.A. Souza, N.G. Ferreira, and M.R. Baldan

Field Emission from Nanocrystalline Diamond/Carbon Nanowall Composite Films Deposited on Scratched Substrates ............. 87
C.Y. Cheng, M. Nakashima, and K. Teii

Shaping of Diamonds in 1D Nanostructures and Strategies for Fabrication of All-Diamond Microcomponents ...................... 93
S. Orlanducci, V. Guglielmotti, V. Sessa, E. Tamburri, M.L. Terranova, F. Toschi, and M. Rossi
Preparation of Diamond Nanocrystallites in Powder by Using a Coaxial Arc Plasma Gun .................................................. 99
Aki Tominaga, Kenji Hanada, Tomohiro Yoshida,
and Tsuyoshi Yoshitake

Effects of Crystallographic Planes on Focused Ion Beam Milled Patterns of Single Crystal Diamonds ................... 105
Rustin Golnabi, Won I. Lee, Deok-Yang Kim,
and Glen R. Kowach

Deposition of Bronze Microwires on Ultrananocrystalline Diamond (UNCD) Electrodes ........................................... 111
Corina Grodek, Lori A. Lepak, Anirudha V. Sumant,
Ralu Divan, Orlando Auciello, Daniel Rosenmann,
Suzanne Miller, Ephriam Daniels, and Michael P. Zach

Fabrication of Nano-needle Arrays on Diamond Surface by Reactive Ion Etching .................................................. 117
T. Misu, K. Koh, and T. Arai

Author Index ............................................................... 123

Subject Index ............................................................. 125
PREFACE

Symposium N, “Diamond Electronics and Biotechnology – Fundamentals to Applications V” was held at the 2011 MRS Fall Meeting in Boston, Massachusetts, November 28 – December 2, 2011. This volume contains submitted, peer-reviewed articles of the rapid advances in these fields. The scope of this meeting stretched from fundamentals to applications of all kinds of diamond, be they single crystal to nanocrystalline, bulk film to nanoparticle. New forms and applications of carbon such as graphene and single photon emission were given particular attention.

The attendance of this series has been consistently high, due to the excellent quality and international nature of the contributions, as well as the choice of invited speakers. New areas such as microplasma arrays from CVD were placed alongside such standards as diamond growth and electrochemistry.

In this symposium, 10 invited oral presentations, 49 contributed oral presentations and 46 posters were presented representing more than 15 countries. We would like to thank all those who contributed to making this diverse and exciting program, especially the student members.

The organizers express their gratitude to the broad spectrum of international members of the scientific committee who actively contributed to the refereeing of abstracts and the construction of such a dynamic program.

The symposium was supported by the following sponsors, to whom we are very grateful:

- Advanced Diamond Technologies Inc.
- Applied Diamond Inc.
- CEA, LIST, France
- Hasselt University, Belgium
- Seki Technotron Inc.
- Sp3 Inc.

We would also like to thank the MRS staff members for their highly professional support and encouragement throughout the process of bringing this symposium to fruition, its smooth running, and the publication of this proceedings volume.

Philippe Bergonzo
Richard B. Jackman
Kian Ping Loh
Greg M. Swain
Oliver A. Williams

April 2012