

*6th International Symposium on
Organic Molecular Electronics
(ISOME2010)*



Book of Abstracts

June 10~11, 2010

*Chiba University
Chiba, Japan*

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Organized by:

Technical Committee of Organic Molecular Electronics, Electronics Society of the Institute of Electronics, Information, and Communication Engineers (IEICE)

Supported by:

Electronics Society of The Institute of Electronics, Information, and Communication Engineers (IEICE)
Division of Molecular Electronics and Bioelectronics, the Japan Society of Applied Physics

In cooperation with:

The Society of Nanometric Interfacial Controlled Electronic Devices, The Japan Society of Applied Physics

Technical Committee on Dielectric and Electrical Insulation Materials, IEEJ

Global Center of Excellence “Advanced School for Organic Electronics”, Chiba University

Preface

Recent Progress in Molecular and Organic Devices

We are pleased to invite you to the 6th International Symposium on Organic Molecular Electronics ISOME2010. This is the 6th in a series of the biennial conference that began in Nagoya University in 2000, continued in Riken (Saitama), Kyoto University, Saitama University, University of Hyogo and now, Chiba University. This symposium has provided a good opportunity for a wide range of researchers to meet together since the development of organic molecular electronics has been supported by different kinds of technologies.

Organic devices such as organic electroluminescent devices, organic thin-film-transistors, organic sensors, biological systems and so on have attracted much attention not only in the field of electronics and photonic applications but also in environmental and energy issues. The main purpose of this symposium is to provide an opportunity for researchers, who are interested in organic molecular electronics, to come together in an informal and friendly atmosphere and exchange their technical knowledge and experience. I am sure that this symposium is very useful and fruitful for all participants to summarize the recent progress in organic molecular electronics and prepare a new step for the next generation.

The symposium will be attended by a wide range of researchers and invited speakers in organic molecular electronics as well as by contributed speakers in various fields including fabrication, evaluation, bio-electronics, field effect devices, sensors, displays and so on. These researchers are very much active in the most progressive topics of organic molecular electronics which have received a great deal of attention. We expect that illuminating discussions are conducted in this symposium to stimulate future development of this field.

I would like to express my sincere thanks to the organizing committee of this symposium and thank many organizations such as the Electronics Society of the Institute of Electronics, Information and Communication Engineers (IEICE), Division of Molecular Electronics and Bioelectronics, The Japan Society of Applied Physics (M&BE), The Society of Nanometric Interfacial Controlled Electronic Devices, The Japan Society of Applied Physics (NICE) for their support including financial one. Thanks are also due to Technical Committee on Dielectric and Electrical Insulation Materials of the Institute of Electrical Engineering in Japan (IEEJ), The Japan Society of Applied Physics, Global Center of Excellence "Advanced School for Organic Electronics", Chiba University for their cooperation. And also, to the many people who have given their great efforts to make this symposium possible and valuable.

Finally, we thank you again for attending the symposium. We hope that all of you have an enjoyable and informative time in Chiba, Japan.

June 10, 2010

ISOME 2010 Chair



Prof. Kazuhiro Kudo

Chiba University

ISOME2010 Conference Schedule

| | Morning | Afternoon | Evening |
|--------------------------|---|--|---|
| June 10 (Thu) | <p>Registration (8:30~17:00)</p> <p>Opening Ceremony (9:00~9:05)</p> <p>Plenary (9:05~9:50)</p> <p>SESSION 1 (9:50~11:00) ~Organic EL & LED~</p> <p>I-1 (09:50~10:20) O1-1 (10:20~10:40) O1-2 (10:40~11:00)</p> <p>Coffee Break(11:00~11:15)</p> <p>SESSION 2 (11:15~12:25) ~ Preparation & Characterization ~</p> <p>I-2 (11:15~11:45) O2-1 (11:45~12:05) O2-2 (12:05~12:25)</p> <p>Poster (12:25~14:25): Lunch</p> | <p>SESSION 3 (14:25~15:55) ~ Organic Photovoltaic Cells ~</p> <p>I-3 (14:25~14:55) O3-1 (14:55~15:15) O3-2 (15:15~15:35) O3-3 (15:35~15:55)</p> <p>Coffee Break(15:55~16:10)</p> <p>SESSION 4 (16:10~17:20) ~ Organic Thin Film Transistors ~</p> <p>I-4 (16:10~16:40) O4-1 (16:40~17:00) O4-2 (17:00~17:20)</p> | <p>Banquet (17:30~19:30)</p> |
| June 11 (Fri) | <p>Registration (8:30~12:00)</p> <p>SESSION 5 (9:00~10:50) ~ Biotechnology & Bioelectronics ~</p> <p>I-5 (9:00~9:30) I-6 (9:30~10:00) O5-1 (10:00~10:20) I-7 (10:20~10:50)</p> <p>Coffee Break(10:50~11:05)</p> <p>SESSION 6 (11:05~12:05) ~ Biotechnology & Bioelectronics ~</p> <p>O6-1 (11:05~11:25) O6-2 (11:25~11:45) O6-3 (11:45~12:05)</p> <p>Lunch (12:05~13:10)</p> | <p>SESSION 7 (13:10~15:00) ~ Organic Photonics ~</p> <p>I-8 (13:10~13:40) O7-1 (13:40~14:00) O7-2 (14:00~14:20) O7-3 (14:20~14:40) O7-4 (14:40~15:00)</p> <p>Coffee Break(15:00~15:15)</p> <p>SESSION 8 (15:15~16:45) ~ Nano Fabrication ~</p> <p>I-9 (15:15~15:45) O8-1 (15:45~16:05) O8-2 (16:05~16:25) O8-3 (16:25~16:45)</p> <p>Closing Remarks (16:45~16:50)</p> | |

ISOME 2010 Program

July 10, Thursday

- Registration 8:30 - 17:00
- Opening 9:00 - 9:50

Chairperson: Kazuhiro Kudo (Chiba University, Japan)

Opening Talk
Kazuhiro Kudo
Chiba University, Japan

- 9:05 **Plenary Lecture**
Innovation in Molecular Electronics and Green Technology
Kazumi Matsushige
Kyoto University, Japan

- Session I (Organic EL & LED) 9:50 - 11:00

Chairperson: Hiroaki Usui (TUAT, Japan)

- I-1
9:50 **A Novel Field Emission Organic Light Emitting Diodes**
Meiso Yokoyama, Chi-Shing Li, and Shui-Hsiang Su
Department of Electronic Engineering, I-Shou University, Taiwan

- O1-1
10:20 **Multilayer Polyfluorene-Based Light-Emitting Diodes for Frequency Response up to 100MHz**
Hirotake Kajii, Toshinari Kojima and Yutaka Ohmori
Center for Advanced Science and Technology, Osaka University, Japan

- O1-2
10:40 **Highly Efficient Red Phosphorescent Organic Light-Emitting Diodes Based on PVK Host Doped Ruthenium [II] Complex Polymers**
Huy-Zu Cheng, Han-Yueh Yang*, Lien-Cheng Kao**, Shui-Hsiang Su**, and Mesio Yokoyama***
**Department of Materials Science and Engineering, I-SHOU University, Taiwan*
***Department of Electronic Engineering, I-SHOU University, Taiwan*

- Coffee Break 11:00 - 11:15

- Session 2 (Preparation & Characterization) 11:15 - 12:25

Chairperson: Takaaki Manaka (Tokyo Tech., Japan)

- I-2
11:15 **Crystal Growth of Organic Semiconductors -Thin Films, Microcrystals and Bulk Single Crystals**
Toshihiro Shimada
Department of Materials Chemistry, Graduate School of Engineering, Hokkaido University, Japan

- O2-1
11:45 **Vapor Deposition Polymerization and Electrical Characterization of TPD Thin Films**
Masakazu Muroyama, Ayako Tajiri, Kyoko Ichida, Seiji Yokokura, Kuniaki Tanaka and Hiroaki Usui
Department of Organic and Polymer Materials Chemistry, Tokyo University of Agriculture and Technology, Japan

- O2-2
12:05 **Probing of Interfacial Charging and Discharging in Double-Layer Device by Time-Resolved Second Harmonic Generation**
Le Zhang, Dai Taguchi, Jun Li, Takaaki Manaka and Mitsumasa Iwamoto
Department of Physical Electronics, Tokyo Institute of Technology, Japan

-Poster Session with Lunch 12:25 - 14:25

-Session 3 (Organic Photovoltaic Cells) 14:25 - 15:55

Chairperson: Hirotake Kajii (Osaka University, Japan)

I-3

14:25 **3D-TCO-Less Dye-Sensitized Solar Cells**

Shuzi Hayase

Graduate School of Life Science and Systems Engineering, Kyushu Institute of Technology, Japan

O3-1

14:55 **Red-Sensitive Organic Photoconductive Device Using Soluble Ni-Phthalocyanine**

Takeshi Fukuda, Zentarō Honda, Norihiko Kamata, and Yoshihiro Ishimaru

Department of Functional Materials Science, Saitama University, Japan

O3-2

15:15 **Improvement of Characteristics of Dye-Sensitized Solar Cells Using Dye of Curcumin**

Hiroki Takeuchi, Koudai Kukita, Shoji Yamauchi and Shoji Furukawa

Graduate School of Computer Science and Systems Engineering, Kyushu Institute of Technology, Japan

O3-3

15:35 **Current-Voltage Characteristics of Porphyrin/ C60 Multi-Layered Organic Photovoltaic Device with and without Hole Collection Oxide Films**

Eiji Itoh, Yuji Higuchi, and Daisuke Furuhashi

Department of Electrical and Electronic Engineering, Shinshu University, Japan

-Coffee Break 15:55 - 16:10

-Session 4 (Organic Thin Film Transistors) 16:10 - 17:20

Chairperson: Yutaka Majima (Tokyo Tech., Japan)

I-4

16:10 **Roll to Roll Gravure Printed 13.56 MHz 16 Bit RFID Tags on Plastic Foils**

Minhun Jung***, Jinsoo Noh***, Joonseok Kim***, Hwiwon Kang**, Soyeon Kim**, Kwangyong Lee*,
Kyunghwan Jung***, Dongsun Yeom**, Yongsu Park*, Minjin Lee*, and Gyoujin Cho*

**Printed Electronics Engineering in World Class University Program, and Chemical Engineering, Suncheon National University, Korea*

***Printed Electronics Research Institute, Paru Co., Korea*

O4-1

16:40 **Channel Formation Process of Pentacene Field Effect Transistor Studied by Displacement Current Measurement for Operating Transistor**

Yuya Tanaka*, Yutaka Noguchi, Hisao Ishii***

**Graduate School of Advanced Integration Science, Chiba University, Japan*

***Center for Frontier Science, Chiba University, Japan*

O4-2

17:00 **Ambipolar Operation in Pentacene FET Probed by Time-Resolved Second-Harmonic Generation**

Takaaki Manaka, Yasuyuki Tanaka, Mitsumasa Iwamoto

Department of Physical Electronics, Tokyo Institute of Technology, Japan

-Banquet 17:30 - 19:30

July 11, Friday

-Registration 8:30 - 12:00

-Session 5 (Biotechnology & Bioelectronics) 9:00 - 10:50

Chairperson: Naoki Matsuda (AIST, Japan)

I-5

9:00 Engineering Interfaces for Bio-Electronics Whilst Maximizing the Desired Bioactivity

*Marcela Bilek**, *Daniel V. Bax*****, *Alexey Kondyurin**, *Neil J. Nosworthy****, *Yongbai Yin**, *David R. McKenzie**, *Cristobal dos Remedios***, *Anthony S. Weiss****

**School of Physics, The University of Sydney, Australia*

*** School of Medical Sciences, The University of Sydney, Australia*

**** School of Molecular and Microbial Biosciences, The University of Sydney, Australia*

I-6

9:30 Design of Novel 2D and 3D Biocompatible Interfaces for Medical Devices

Masaru Tanaka

Department of Biochemical Engineering, Graduate School of Science and Engineering, Yamagata University, Japan

O5-1

10:00 Electrochemical Characterization of Alkaline Phosphatase and Respiration Activities from Mouse Embryonic Bodies

Hitoshi Shiku, Yuto Hasegawa, Shinichiro Takano, Kosuke Ino, Tomokazu Matsue

Graduate School of Environmental Studies, Tohoku University, Japan

I-7

10:20 Stochastic Resonance Emerging on Coulomb Blockade Network Induced on Redox-Active Biomolecular Arrays

Takuya Matsumoto

ISIR, Osaka University, Japan

-Coffee Break 10:50 - 11:05

-Session 6 (Biotechnology & Bioelectronics) 11:05 - 12:05

Chairperson: Hitoshi Shiku (Tohoku University, Japan)

O6-1

11:05 Development of Rapid Immunosensors Based on Manipulation of Microparticles by Negative Dielectrophoresis

Tomoyuki Yasukawa, Javier Ramon-Azcon, Fumio Mizutani

Graduate School of Material Science, University of Hyogo, Japan

O6-2

11:25 In situ Observation of Electron Transfer Reaction of Cytochrome *c* on ITO Electrode by Time-Resolved Slab Optical Waveguide Spectroscopy

Naoki Matsuda, Hirotaka Okabe, Akiko Takatsu, Kenji Kato

Measurement Solution Research Center, National Institute of Advanced Industrial Science and Technology, Japan

O6-3

11:45 Analyzing Relationship between Bioelectric Potential Response and Photosynthesis Reaction

Ki Ando, Yuki Hasegawa, Hidekazu Uchida, Tamaki Yaji

Graduate School of Science and Engineering, Saitama University, Japan

-Lunch Time 12:05 - 13:10

-Session 7 (Organic Photonics) 13:10 - 15:00

Chairperson: Keizo Kato (Niigata University, Japan)

I-8

13:10 **Green Synthesis of Advanced Functional Metal Nanoparticles and Their Applications in Surface Enhanced Analysis**

Sanong Ekgasit

Sensor Research Unit at Department of Chemistry Faculty of Science, Chulalongkorn University, Thailand

O7-1

13:40 **Numerical Simulation of Cholesteric Liquid Crystal Laser Based on ADE-FDTD Method**

Tatsunosuke Matsui^{*,**} and *Masahiro Kitaguchi*^{*}

**Department of Electrical and Electronic Engineering, Graduate School of Engineering, Mie University, Japan*

***The Center of Ultimate Technology on Nano-Electronics, Mie University, Japan*

O7-2

14:00 **Optimization of Microscope Objective Unit for Studying Fluorescence Emitters under High-Vacuum and Ambient Gas Conditions and Its Applications**

Toshiki Yamada and Akira Otomo

Kobe Advanced ICT Research Center, National Institute of Information and Communications Technology, Japan

O7-3

14:20 **Preparation of Nanoparticle-Doped Hybrid Polymers and Photonic Applications**

Okihiko Sugihara, Bin Cai, Hendry I Elim, Yu Kurata, Toshikuni Kaino, Kyoji Komatsu

Institute of Multidisciplinary Research for Advanced Materials, Tohoku University, Japan

O7-4

14:40 **Probing of Electric Field Distribution in ITO/PI/P3HT/Au Using Electric Field Induced Second Harmonic Generation**

Ryo Miyazawa, Dai Taguchi, Martin Weis, Takaaki Manaka, and Mitsumasa Iwamoto

Department of Physical Electronics, Tokyo Institute of Technology, Japan

-Coffee Break 15:00 - 15:15

-Session 8 (Nano Fabrication) 15:15 - 16:45

Chairperson: Takeshi Fukuda (Saitama University, Japan)

I-9

15:15 **Structural and Chemical Control of Solid Surfaces for Well-Defined Biointerfaces**

Toshio Ogino and Toshinari Isono

Yokohama National University, Japan

O8-1

15:45 **A highly Efficient Sublimation Purification System of Organic Materials Using Baffles with Orifices**

Hyeon-Gu Jeon, Yoshinari Kondo, Shuji Maki, Eiichi Matsumoto, Yoshio Taniguchi, Musubu Ichikawa

Faculty of Textile Science and Technology, Shinshu University, Japan

O8-2

16:05 **Free Electron Laser-Polymerization of C60 Grown by Liquid-Liquid-Interfacial Precipitation Method**

Daiki Koide, Shouta Kato, Eri Ikeda, Nobuyuki Iwata and Hiroshi Yamamoto

College of Sci. & Technol., Nihon University, Japan

O8-3

16:25 **Estimation of Carrier Density Change Caused by Ambient for Organic Semiconductor by Means of Seebeck Effect Measurement**

Ryuuto Yamamoto, Kouji Suemori, Toshihide Kamata

Photonics Research Institute, National Institute of Advanced Industrial Science and Technology, Japan

-Closing 16:45 - 16:50

Concluding Remarks

Tohru Maruno

NTT-AT, Japan

Poster Session (July 10, Thursday, 12:25 - 14:25)

P-1

Two-Photon Sensitized Polymerization of Pyrrole for Fabrication of Conducting Polymer Microspring Array

Katsumi Yamada*, Junji Sone** and Jun Chen***

*Department of Nanochemistry, and Department of Life Science and Sustainable Chemistry, Tokyo polytechnic university, Japan

**Department of Applied Computer Science, Tokyo polytechnic university, Japan

***Department of Media and Image Technology, Tokyo polytechnic university, Japan

P-2

Fabrication of Grating Films from Metal Nanoparticles

Ryosuke Yamazaki* Akira Baba*, Kazunari Shinbo*, Keizo Kato*, Futao Kaneko*, Sanong Ekgasit** and Chuchaat Thammacharoen**

*Center for Transdisciplinary Research and Graduate School of Science and Technology, Niigata University, Japan

**Sensor Research Unit at Department of Chemistry Faculty of Science, Chulalongkorn University, Japan

P-3

Material Efficiency in Electrophoretic Deposition of Conjugated Polymer Estimated from Optical Absorption of Residual Suspension

Kazuya Tada and Mitsuyoshi Onoda

Division of Electrical Engineering, University of Hyogo, Japan

P-4

Floating Film Transfer Method as a Procedure to Improve the Transport Performance in Organic Semiconductor Thin-Film

Wataru Takashima*, Takeomi Morita**, Arnaud Dauendorffer**, Shuichi Nagamatsu*** and Keiichi Kaneto**

*Research Center for Advanced Eco-fitting Technology, Kyushu Institute of Technology, Japan

**Graduated School of Life Science and Systems Engineering, Kyushu Institute of Technology, Japan

***Department of Computer Science and Systems Engineering, Kyushu Institute of Technology, Japan

P-5

Fabrication of Fine Particles of Semiconducting Polymers by Electro spray Deposition

Yuto Hirose, Itaru Natori, Hisaya Sato, Kuniaki Tanaka and Hiroaki Usui

Department of Organic and Polymer Materials Chemistry, Tokyo University of Agriculture and Technology, Japan

P-6

Fabrication of Ordered Metal Coordinated Peptide Monolayer and its Electrochemical Properties

Xinxin Wang, Kenji Nagata and Masahiro Higuchi

Department of Materials Science and Technology, Graduate School of Engineering, Nagoya Institute of Technology, Japan

P-7

Formation of Polymer Films via Photochemical Reaction on Si-H Surface and Functional Estimation

Koji Funato, Masayuki Toyoshima, Yoshiko Miura, Nobuhiko Yui

Department of Chemical Engineering, Faculty of Engineering, Kyushu University, Japan

P-8

Effect of Impurity Ions on the Alignment of 5CB Liquid Crystal Molecules Investigated by Surface Plasmon Resonance and Optical Waveguide Spectroscopy

Aya Ikarashi*, Akira Baba***, Kazunari Shinbo***, Keizo Kato***, and Futao Kaneko***

*Graduate School of Science and Technology, Niigata University, Japan

**Center for Transdisciplinary Research, Niigata University, Japan

P-9

Effect of Modified Graphite on Electrical Resistivities of Graphite/PS Nanocomposites via Solution Blending

Ricardo Quintero Restrepo, Kenji Nagata, Masahiro Higuchi and Takatoshi Kinoshita

Graduate School of Engineering, Nagoya Institute of Technology, Japan

P-10

Surface Plasmon Excitation and Emission Light Properties Using Hybrid Setup of Prism and Grating Coupling

Yuta Hirano, Masayuki Sakai, Masahiro Minagawa, Yasuo Ohdaira, Akira Baba, Kazunari Shinbo, Keizo Kato, Futao Kaneko

Graduate School of Science and Technology, Niigata University, Japan

P-11

Self-Guided Waves in Photorefractive Polymer Films

Takashi Fujihara*, Takafumi Sassa*, Tsuyoshi Muto* and Shinsuke Umegaki**

*RIKEN (The Institute of Physical and Chemical Research), Japan

**Faculty of Science and Technology, Keio University, Japan

P-12

Effect of Water Contact Angles on Surfaces of Varied Buffer Layer for Organic Photovoltaic Devices

Wang-Ta Chiang, Shui-Hsiang Su and Meiso Yokoyama

Department of Electronic Engineering, I-Shou University, Taiwan

P-13

CMOS Circuits Based on a Stacked Structure Using Silicone-Resin as Dielectric Layers

Kodai Kikuchi*, Fanghua Pu*, Hiroshi Yamauchi*, Yasuyuki Watanabe**, Masaaki Iizuka***, Masakazu Nakamura* and Kazuhiro Kudo*

*Graduate School of Engineering, Chiba University, Japan

**Center for Frontier Science, Chiba University, Japan

***Faculty of Education, Chiba University, Japan

P-14

Fabrication of Single Wall Carbon Nanotube Based FET by Dip-Pen Nanolithography

Tong Wang, Said Kazaoui, Yoshiki Shimizu, Hirobumi Ushijima

Photonics Research Institute, National Institute of Advanced Industrial Science and Technology (AIST), Japan

P-15

Study on Stability of Formaldehyde Sensing Material Using Molecular Orbital Calculation

Yasuko Y. Maruo*, Jiro Nakamura*, Hiroyuki Teramae**

*NTT Energy & Environment Systems Laboratories, Japan

**Department of Chemistry, Josai University, Japan

P-16

Immobilization of Enzymes in Mesoporous Silica Materials for Biosensor Applications

Tetsuji Itoh*, Takeshi Shimomura**, Touru Sumiya**, Taka-aki Hanaoka*, Fujio Mizukami*, Masatoshi Ono**

*National Institute of Advanced Industrial Science and Technology (AIST), Japan

**Funai Electric Advanced Applied Technology Research Institute Inc. (FEAT), Japan

P-17

Hepatocyte Spheroids Underlayered with Nonparenchymal Cells for Biomedical Applications

Yuichi Nakasone, Masashi Yamamoto, Kazunori Kataoka, Tetsuya Tateishi, Hidenori Otsuka

Kobe Advanced ICT Research Center, National Institute of Information and Communications Technology, Japan

P-18

Selective Deposition of Lipid Bilayers on Locally Anodic-Oxidized Silicon Surface

Masaya Nakamura, Toshinari Isono and Toshio Ogino

Graduate School of Engineering, Yokohama National University, Japan

P-19

Flexible and Transparent Microelectrode Arrays Made from Poly(3,4-ethylenedioxythiophene) Poly(styrenesulfonate) and an Amorphous Perfluoropolymer for Electrophysiological Measurement

Hiroaki Takehara***, Akira Nagaoka***, Jun Noguchi*****, Takanori Akagi*****, Haruo Kasai*****, Takanori Ichiki*****

*Department of Bioengineering, School of Engineering, The University of Tokyo, Japan

**Research Fellow of the Japan Society for the Promotion of Science, Japan

***Center for Disease Biology and Integrative Medicine, Graduate School of Medicine, The University of Tokyo, Japan

****Center for Nano-Bio Integration (CNBI), The University of Tokyo, Japan

P-20

Control of Non-Specific Adsorption of Protein Molecules on Sapphire Surfaces

Tomoya Wada, Kenji Yamazaki, Toshinari Isono and Toshio Ogino

Department of Electrical and Computer Engineering, Yokohama National University, Japan