# 2nd International Symposium on Organic Molecular Electronics (ISOME2002) Proceedings


## Electronics Sosiety of IEICE

(Institute of Electronics, Information and Communication Engineers)

and

## RIKEN

Electronics Society

RIKEN

**PREFACE**

The 2nd International Symposium on Organic Molecular Electronics (ISOME 2002) will be held on May 16 and 17, 2002, RIKEN, Saitama, Japan. The ISOME 2002 is sponsored by Electronics Society of IEICE (the Institute of Electronics, Information and Communication Engineers) and RIKEN.

Much progress in the field of Organic Molecular Electronics will be expected in early 21st century. Recently, new organic devices such as organic EL devices, organic TFT, organic sensors and non-linear optical devices have attracted much attention. In such a situation, the purpose of ISOME 2002 is to provide an opportunity for people, who are interested in Organic Molecular Electronics, to come together in an informal and friendly atmosphere and exchange their technical information and experience. I am sure that this International Symposium is very useful and fruitful for all participants to summarize the recent progress in Organic Molecular Electronics and prepare a new step to the next generation.

Many papers have been submitted from various countries and more than 30 papers have been accepted for presentation. All the papers accepted will be presented and published in English. Main topics of interest are as follows;

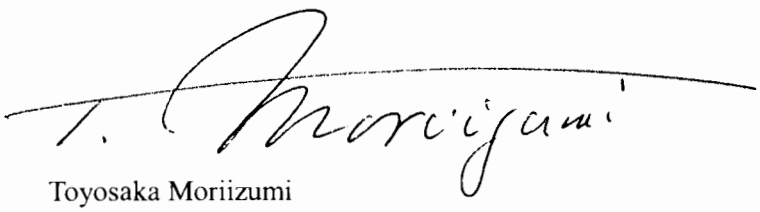
1. Electroluminecent Devices
2. Electronic Devices
3. Conductive Polymers and Their Applications
4. Sensors
5. Fabrication and Characterization of Thin Films
6. Optics

The program of this symposium consists of a Plenary Session, six invited talks and six Oral Sessions. Beside, excellent papers will be selected from the papers presented in ISOME 2002 and they will be published in the Special Issue on Organic Molecular Electronics of IEICE transaction.

This symposium has been planned and organized by the Organizing Committee (Chair : Prof. T. Moriizumi, TIT), the Program Committee (Chair : Prof. K. Tanaka, Chiba University) and the IEICE Committee on Organic Material Electronics (Chair : Prof. K. Matsushige, Kyoto University). I am greatly in debt to their chairs and members, without whose enthusiastic effort on this symposium would not have been possible. I would like to express my sincere gratitude to staff and students of RIKEN for their kind help.

Finally, I am grateful to The Electronics Society of The Institute of Electronics, Information and Communication Engineers and the IEICE Committee on Organic Material Electronics for the financial support.

Welcome to RIKEN. I hope that you will have a fruitful and enjoyable time here in Saitama.



Toyosaka Moriizumi
ISOME 2002, Chair , TIT, Japan

The Symposium is held under auspices of The Electronics Society of IEICE (the Institute of Electronics, Information and Communication Engineers) and RIKEN.

**Financial support from**

1. The Electronics Society of The Institute of Electronics, Information and Communication Engineers
2. Committee on Organic Material Electronics of The Institute of Electronics, Information and Communication Engineers

**Organizing Committee**

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| Mitsumasa Iwamoto | (Tokyo Institute of Technology) |
| Yutaka Ohmori | (Osaka University) |
| Shinzo Morita | (Nagoya University) |
| Kazumi Matsushige | (Kyoto University) |
| Teruaki Katsube | (Saitama University) |

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| Kuniaki Tanaka | (Chiba University, Chairman) |
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| Tohru Maruno | (NTT) |
| Kazuhiro Kudo | (Chiba University) |
| Masaharu Satoh | (NEC) |
| Takamichi Nakamoto | (Tokyo Institute of Technology) |
| Tatsuo Wada | (RIKEN) |

**Accountant:**

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| Tohru Maruno | (NTT) |

**Inspector:**

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|---|---|
| Mitsumasa Iwamoto | (Tokyo Institute of Technology) |

# *2nd International Symposium on Organic Molecular Electronics*

| Time H | Time M | May 16 (THU) Okochi Hall | May 17 (FRI) Okochi Hall | Time M | Time H |
|---|---|---|---|---|---|
| 8 | 30 | Registration | Registration | 30 | 8 |
| | 40 | | | 40 | |
| | 50 | | | 50 | |
| 9 | 0 | | Session V (Invited Talk) 30min x 3papers<br>Chair (Prof.Iwamoto, Dr.Maruno) | 0 | 9 |
| | 10 | | | 10 | |
| | 20 | | | 20 | |
| | 30 | Opening(10min.) | | 30 | |
| | 40 | Special session (Prenary Talk, 30min) | | 40 | |
| | 50 | | | 50 | |
| 10 | 0 | | | 0 | 10 |
| | 10 | Session I (Invited Talk) 30min x 3papers<br>Chair (Prof.Katsube, Prof.Kudo, Prof.Onoda) | | 10 | |
| | 20 | | | 20 | |
| | 30 | | Coffee Break | 30 | |
| | 40 | | | 40 | |
| | 50 | | | 50 | |
| 11 | 0 | | Session VI Sensors 3 papers<br>Chair (Prof.Kato and Prof.Nakamoto) | 0 | 11 |
| | 10 | | | 10 | |
| | 20 | | | 20 | |
| | 30 | | | 30 | |
| | 40 | Lunch | | 40 | |
| | 50 | | | 50 | |
| 12 | 0 | | Lunch | 0 | 12 |
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| | 20 | | | 20 | |
| | 30 | | | 30 | |
| | 40 | | | 40 | |
| | 50 | | | 50 | |
| 1 | 0 | Session II EL Devices (6 papers)<br>Chair (Prof.Usui and Prof.Onoda) | Session VII Fabrication and Charaterization of Thin Films (7papers)<br>Chair (Prof.Iwamoto and Prof.Ohmori) | 0 | 1 |
| | 10 | | | 10 | |
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| | 50 | | | 50 | |
| 3 | 0 | Coffee Break | | 0 | 3 |
| | 10 | | | 10 | |
| | 20 | Session III Electronic Devices (6 papers)<br>Chair (Prof.Kudo and Prof.Kaneto) | Coffee Break | 20 | |
| | 30 | | | 30 | |
| | 40 | | | 40 | |
| | 50 | | | 50 | |
| 4 | 0 | | Session VIII Optics (7 papers)<br>Chair (Dr.Maruno and Dr.Wada) | 0 | 4 |
| | 10 | | | 10 | |
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| 5 | 0 | | | 0 | 5 |
| | 10 | | | 10 | |
| | 20 | Coffee Break | | 20 | |
| | 30 | Session IV Conductive Polymer (2 papers)<br>Chair (Prof.Kaneto) | | 30 | |
| | 40 | | | 40 | |
| | 50 | | | 50 | |
| 6 | 0 | | Closing the Conference | 0 | 6 |
| | 10 | Welcome Party<br>(Welfare and Conference Building) | | | |
| | 20 | | | | |
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| 7 | 0 | | | | |
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| | 30 | | | | |
| | 40 | | | | |

# *2nd International Symposium on Organic Electronics (ISOME) Program*

***May 16-17, 2002, Okochi Hall, RIKEN***
***(2-1 Hirosawa, Wako, Saitama 351-0198, JAPAN)***

## *May 16 (Thursday)*

**Opening Remark** **9:30-9:40**

Toyosaka MORIIZUMI (Tokyo Institute Technology)
Shun-ichi KOBAYASHI (President, RIKEN)

**Plenary Talk** **9:40-10:10**

**Spatio-Temporal Functions and Nano-sized Organization of Artificial Materials**
Toyoki KUNITAKE
Group Director, Spatio-Temporal Function Materials Research, FRS, RIKEN

**Session I: Invited Talk (3 papers)** **10:10-11:40**

**IT1**

**CMOS and Polymer Based Chemical Microsensors**
H. Baltes, C. Hagleitner and A. Hierlemann
Physical Electronics Laboratory, ETH Zurich

**IT2**

**Enhanced Performance in Pentacene TFT Prepared by Surface Treatment of Gate Dielectrics**
Chung Kun SONG
Division of Electrical & Electronics & Computer Eng, Dong-A University

**IT3**

**Electroluminescence and Amplified Spontaneous Emission from Self-Organized Crystals of Organic Semiconducting Oligomers**
Hisao YANAGI[1], Shu HOTTA[2] and Yoshio TANIGUCHI[3]
[1]Faculty of Engineering, Kobe University, and PRESTO, Japan Science and Technology Corporation (JST)
[2]Joint Research Center for Harmonized Molecular Materials (JRCHMM)-Japan Chemical Innovation Institute (JCII)
[3]Faculty of Textile Science and Technology, Shinshu University

**Lunch**

## Session II: Electroluminescent Devices (6 papers) 13:00-15:00

**EL1**

**Organic Light Emitting Diode Using 8-Hydroxyquinoline Aluminum Doped with Rubrene for Application on a Flexible Electro-Optical Conversion Device**

Hirotake KAJII[1], Takayuki TANEDA[1], Takahisa TSUKAGAWA[1], Masamitsu KANEKO[1], Katsumi YOSHINO[2], Masanori OZAKI[2], Akihiko FUJII[2], Makoto HIKITA[3], Satoru TOMARU[3], Saburo IMAMURA[3], Hisataka TAKENAKA[3], Junya KOBAYASHI[3], Fumio YAMAMOTO[3] and Yutaka OHMORI[1]

[1]Collaborative Research Center for Advanced Science and Technology, Osaka University
[2]Department of Electronic Engineering, Graduate School of Engineering, Osaka University
[3]NTT Advanced Technology Corp.

**EL2**

**Electrical and Emitting Properties of Organic Electroluminescent Diodes with Nanostructured Cathode Buffer-Layers of Al/Alq3 Ultrathin Films**

Kazunari SHINBO[1], Eigo SAKAI[1], Futao KANEKO[1], Keizo KATO[1], Takahiro KAWAKAMI[1], Toyoyasu TADOKORO[2], Shinichi OHTA[2] and Rigoberto C. ADVINCULA[3]

[1]Department of Electrical and Electronic Engineering, Niigata University
[2]R&D Center, Nippon Seiki Co. Ltd.
[3]Department of Chemistry, University of Alabama at Birmingham

**EL3**

**Organic Electroluminescent Diodes with a Nanostructured Fullerene Layer at the Interface between Electron- and Hole-Transport Layers**

Keizo KATO[1], Keisuke SUZUKI[1], Kazunari SHINBO[1], Futao KANEKO[1], Nozomu TSUBOI[2], Satoshi KOBAYASHI[2], Toyoyasu TADOKORO[3] and Shinichi OHTA[3]

[1]Department of Electrical and Electronic Engineering, Niigata University
[2]Department of Material Science and Technology, Niigata University
[3]R&D Center, Nippon Seiki Co. Ltd.

**EL4**

**Electrical Characterization of Hole Transport Materials Using In-Situ Field Effect Measurement**

Masaaki IIZUKA, Masakazu NAKAMURA, Kazuhiro KUDO and Kuniaki TANAKA
Department of Electronics and Mechanical Engineering, Chiba University

**EL5**

**Study on the Conduction Mechanism of Organic Light-Emitting Diode Using One-Dimensional Discontinuous Model**

Takuya OGAWA, Don-Chan CHO, Kazue KANEKO, Tatsuo MORI and Teruyoshi MIZUTANI
Department of Electrical Engineering, Nagoya University

**EL6**

**Photoirradiation Effects on Light-Emitting Devices Based on Poly(p-phenylene vinylene) Derivative**

Kazuya TADA and Mitsuyoshi ONODA
Department of Electrical Engineering, Himeji Institute of Technology

## Coffee Break

## Session III: Electronic Devices (6 papers) 15:20-17:20

**ED1**

**Nanostructure of Metal/Organic Interface Causing Photocurrent Multiplication Phenomenon**

Masahiro HIRAMOTO
Graduate School of Engineering, Osaka University

**ED2**

**Fabrication of Organic Photoreceptor Device with Multilayered Structure**

Sei UEMURA, Manabu YOSHIDA, Takehito KODZASA, Hirobumi USHIJIMA, Kiyoshi Yase and Toshihide KAMATA
National Institute of Advanced Industrial Science and Technology (AIST)

**ED3**

**Effect of Interfacial Space Charges and Coupling Electrodes on Organic Single Electron Tunneling Device**

Yutaka NOGUCHI[1], Mitsumasa IWAMOTO[1], Tohru KUBOTA[2] and Shinro MASHIKO[2]
[1]Department of Physical Electronics, Tokyo Institute of Technology
[2]Communication Research Laboratory,

**ED4**

**High-Performance Organic FET with Functional Layers**

Manabu YOSHIDA[1], Sei UEMURA[1], Takehito KODZASA[1], Hirobumi USHIJIMA[1], Toshihide KAMATA[1], Makoto MATSUZAWA[2] and Takeshi KAWAI[2]
[1]National Institute of Advanced Industrial Science and Technology (AIST)
[2]Science University of Tokyo

**ED5**

**Fabrication of Organic FET Device with Dielectric Gate Insulator Prepared by Sol-Gel Technique**

Takehito KODZASA, Manabu YOSHIDA, Iwao YAMAGUCHI, Sei UEMURA, Hirobumi USHIJIMA, Toshiya KUMAGAYA and Toshihide KAMATA
National Institute of Advanced Industrial Science and Technology (AIST)

**ED6**

**Surface Spectroscopy and Electronic Properties of Organic Thin Film Electronic Device Structures**

Toshihiro SHIMADA[1,2] and Atsushi KOMA[2]
[1]PREST, Japan Science and Thechnology Corporation
[2]Department of Chemistry, School of Science, The University of Tokyo

## Coffee Break

## Session IV: Conductive Polymers & Their Applications (2 papers) 17:30-18:10

**CP1**

**Synthesis and Electrochemical Characterization of a Polyradical Cathode Material for Rechargeable Batteries**

Jiro IRIYAMA, Kentaro NAKAHARA, Shigeyuki IWASA, Yukiko MORIOKA, Masahiro

SUGURO and Masaharu SATOH
Functional Materials Research Laboratories, NEC Corporation

**CP2**

**Wavelet Analysis of Pattern of Neuron-Type Conducting Polymer**
Masaharu FUJII, Ryotaro OZAKI, Haruo IHORI and Kiyomitsu ARII
Fuculty of Engineering, Ehime University

## Welcome Party (Welfare and Conference Building) 18:10-19:40

## *May 17 (Friday)*

## Session V: Invited Talk (3 papers) 9:00-10:30

**IT4**

**Transport and Photocarrier Generation at Nanometric Interface of Conducting Polymers and Metals**
Keiichi KANETO[1], Koichi RIKITAKE[2] and Wataru TAKASHIMA[1]
[1]Graduate School of Life Science and Systems Engineering, Kyushu Institute of Technology
[2]Department of Computer Science and Systems Engineering, Kyushu Institute of Technology

**IT5**

**Self-Assembled Monolayers and Gold Nanoparticles as the Basis Sets For the Molecular Scale Electronics**
Changjin LEE,[1] Yongku KANG, [1] Sung Rim KIM, [1] Do-Jae WON, [1] Kyehyung LEE, [1] Jae Sung NOH[1], Hoon Kyu SHIN,[2] Chung Keun SONG,[2] Do Hyun KIM, [2] Young Soo KWON, [2] Hye-Mi SO, [3] and Jinhee KIM[3]
[1]Korea Research Institute of Chemical Technology
[2]Dong-A University
[3]Korea Research Institute of Standards and Science

**IT6**

**Optical Properties of Organic Nonlinear Optical Materials and their Device Applications**
Toshikuni KAINO
Institute of Multidisciplinary Research for Advanced Materials, Tohoku University

## Coffee Break

## Session VI: Sensors (3 papers) 10:50-11:50

**SE1**

**Study of Quartz Crystal Microbalance Odor Sensing System for Apple and Banana Flavors**
Severino MUNOZ, Takamichi NAKAMOTO and Toyosaka MORIIZUMI
Graduate School of Science and Engineering, Tokyo Institute of Technology

**SE2**

**An Application Possibility of Self-Ordered Mesoporous Silicate for Surface Photo Voltage (SPV) Type NO Gas Sensor (I): The Characterization of Nonionic Triblock Copolymer Templated Self-Ordered Mesoporous Silicates and Preparation Their Film for Device Application**

Takeo YAMADA[1,2], Hao-Shen ZHOU[1], Hidekazu UCHIDA[4], Masato TOMITA[3], Yuko UENO[3], Keisuke ASAI[2], Itaru HONMA[1] and Teruaki KATSUBE[4]
[1]National Institute of Advanced Industrial Science and Technology (AIST)
[2]Department of Quantum Engineering and Systems Science, The University of Tokyo
[3]NTT lifestyle and Environmental Technology Laboratories
[4]Department of Information and Computer Science, Saitama University

**SE3**

**An Application Possibility of Self-Ordered Mesoporous Silicate for Surface Photo Voltage (SPV) Type NO Gas Sensor (II): Self-Ordered Mesoporous Silicate Incorporated SPV Device and Its Sensing Property Dependence on Mesostructure**

Takeo YAMADA[1,2], Hao-Shen ZHOU[1], Hidekazu UCHIDA[4], Masato TOMITA[3], Yuko UENO[3], Keisuke ASAI[2], Itaru HONMA[1] and Teruaki KATSUBE[4]
[1]National Institute of Advanced Industrial Science and Technology (AIST)
[2]Department of Quantum Engineering and Systems Science, The University of Tokyo
[3]NTT lifestyle and Environmental Technology Laboratories
[4]Department of Information and Computer Science, Saitama University

## Lunch

## Session VII: Fabrication & Characterization of Thin Films (7 papers)

**13:00-15:20**

**TF1**

**C-Au Film Formed by Co-Operation Process of Methane Plasma CVD and Sputtering of Gold**

Md. Abul KASHEM, Masaki MATUSHITA and Shinzo MORITA
Department of Electronics, Graduate School of Engineering, Nagoya University

**TF2**

**Investigation of Surface Potential Occurring at Metal/Phthalocyanine Interfaces by Electro-Absorption Technique**

Takaaki MANAKA, Xiaoman CHENG, Chen Quan LI and Mitsumasa IWAMOTO
Department of Physical Electronics, Tokyo Institute of Technology

**TF3**

**Light Emission from Prism/Ag/Molecular Films due to Multiple Surface Plasmon Excitations by Reverse Irradiation in the Kretschmann Configuration**

Mitsuru TERAKADO[1], Toshiharu SATO[1], Takayuki NAKANO[1], Futao KANEKO[1], Kazunari SHINBO[1], Keizo KATO[1] and Takashi WAKAMATSU[2]
[1]Department of Electrical and Electronic Engineering, Niigata University
[2]Department of Electrical Engineering, Ibaraki National College of Technology

**TF4**

**Fabrication and Surface Plasmon Excitation Properties of Polystyrene Micro-Sphere Thin**

**Films**

Futao KANEKO[1], Syunsuke MIYABAYASHI[1], Hajime KOBAYASHI[1], Kazunari SHINBO[1,3], Keizo KATO[1], Masato TANAKA[2] and Rigoberto C. ADVINCULA[3]
[1]Department of Electrical and Electronic Engineering, Niigata University
[2]Department of Chemistry and Chemical Engineering, Niigata University
[3]Department of Chemistry, University of Alabama at Birmingham

TF5

**Effect of Surface Hydrophilicity and Solution Chemistry on the Adsorption Behavior of Cytochrome *c* in Quartz Studied Using Slab Optical Waveguide (SOWG) Spectroscopy**

Jose H. SANTOS, Naoki MATSUDA, Zhi-mei QI, Akiko TAKATSU and Kenji KATO
Nanoarchitectonics Research Center, AIST

TF6

**Computation of Interaction Energy Between the Calcium Ion Channel Gating Subunits on the Excitable Biological Membrane**

Hirohumi HIRAYAMA
Department of Public Health, Asahikawa Medical College

TF7

**Local Area Characterization of Evaporated TTF-TCNQ Complex Films with Scanning Tunneling Spectroscopy**

Masakazu NAKAMURA, Masaaki IIZUKA, Kazuhiro KUDO and Kuniaki TANAKA
Department of Electronics and Mechanical Engineering, Chiba University

## Coffee Break

## Session VIII: Optics (7 papers) 15:40-18:00

OP1

**Application of Fluorinated Polyimide Waveguide to Integrated Optical Sensors**

Renshi SAWADA, Eiji HIGURASHI and Takahiro ITO
NTT Telecommunications Energy Laboratories

OP2

**Optical Detectors for Polymeric Optical Integrated Devices**

Yutaka OHMORI, Takahisa TSUKAGAWA, Masamitsu KANEKO, Takayuki TANEDA and Hirotake KAJII
Osaka University, Collaborative Research Center for Advanced Science and Technology (CRest)

OP3

**Ionization-Assisted Deposition of Azo-Containing Polyurea for NLO Applications**

Hiroaki USUI, Fumiko KIKUCHI, Kuniaki TANAKA, Toshiyuki WATANABE and Seizo MIYATA
Faculty of Technology, Tokyo University of Agriculture and Technology

OP4

**Waveguide Fabrication of 4-(4-dimethylaminostyryl)-1-methylpyridinium tosylate (DAST) Crystal**

Kyoji KOMATSU, Kazuya TAKAYAMA, Bin CAI, Toshikuni KAINO

Institute of Multidisciplinary Research for Advanced Materials, Tohoku University

**OP5**

**Thermo-Optic Devices Using Polymer Waveguides**

Seiji TOYODA, Naoki OOBA, Tsutomu KITOH, Takashi KURIHARA and Tohru MARUNO
NTT Photonics Laboratories, NTT Corporation

**OP6**

**Multiplexed Holography with Monolithic Photorefractive Trimer**

Tetesuya AOYAMA[1], Emi TAKABAYASHI[1], Yadong ZHANG[1], Hiroyuki SASABE[2], Tatsuo WADA[1]
[1]Supramolecular Science Lab., RIKEN□[2]Chitose Institute of Science & Technology

**OP7**

**Near Field Optical Recording on Azopolymer Using a Sub-Microsecond Pulse**

Taiji IKAWA, Chang-Dae KEUM, Hideki TAKAGI, Masaaki TSUCHIMORI, Osamu WATANABE, Wataru MORI, Masaya HARADA, Masahiro TAWATA and Hiroshi SHIMOYAMA
Toyota Central R&D Labs., Inc.

## Closing Remark 18:00-18:10