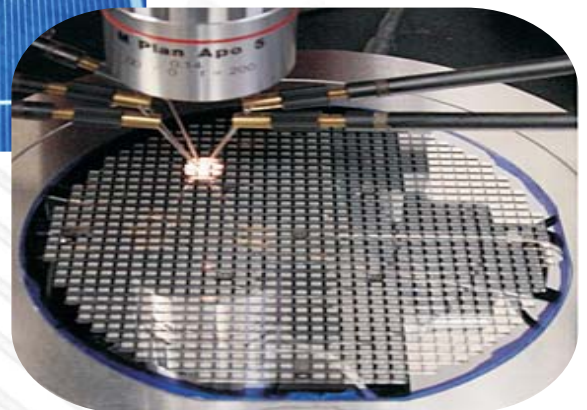
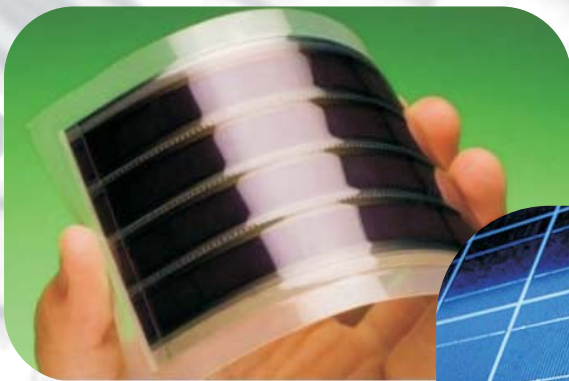


ISBN : 978-602-19889-0-9

# PROCEEDINGS

## THE 5<sup>th</sup> IMEN-LIPI JOINT SEMINAR

on Microelectronic Devices, System, and Instrumentations



**Yogyakarta**  
**November 16-17, 2011**

published by :



# Proceedings of The 5<sup>th</sup> IMEN – LIPI Joint Seminar on Microelectronic Devices, System, and Instrumentations

## Editor

Dr. Goib Wiranto

## Technical Editor

Widhya Budiawan  
Natalita Maulani Nursam

## Layout and Cover

Widhya Budiawan

ISBN : 978-602-19889-0-9

## Published by :



Research Center for Electronics and Telecommunication  
Indonesian Institute of Sciences

Kampus LIPI Jl. Sangkuriang Bandung 40135

Phone : +62 22 2504660

Fax : +62 22 2504659

Website : [www.ppet.lipi.go.id](http://www.ppet.lipi.go.id)

## **COMMITTEE**

### **ADVISORY BOARD**

Prof. Dato' Dr. Burhanuddin Yeop Majlis (Director of IMEN - UKM Malaysia)  
Dr. Ir. Syahrul Aiman (Deputy Chairman of Engineering Science - LIPI)  
Dr. Hiskia (Head of PPET - LIPI)  
Dr. Ir. Widi Setiawan (Head of PTAPB - BATAN)  
Dr. Goib Wiranto (PPET LIPI)  
Dr. Kuwat Triyana (UGM)  
Dr. Ing. Ari Setiawan, M.Si (UGM)  
Prof. Drs. Sudjatmoko, SU (PTAPB BATAN)  
Drs. BA. Tjipto Sujitno, MT (PTAPB BATAN)  
Ir. Slamet Santosa, MSc (PTAPB BATAN)

### **ORGANIZING COMMITTEE**

#### **General Chairman**

Dr. Goib Wiranto (PPET LIPI)

#### **Vice Chairman**

Drs. BA. Tjipto Sujitno, MT (PTAPB BATAN)

#### **Secretariat**

Noorfiya Umniyati (PPET LIPI)

#### **Finance Division**

Emil Kristanti (PPET LIPI)

#### **Program Division**

Grace A. Mambu (PPET LIPI)  
Lia Muliani Pranoto (PPET LIPI)  
Slamet Widodo (PPET LIPI)  
Hana Maria (PTAPB BATAN)  
Wiwien Andriyani (PTAPB BATAN)  
Emy Mulyani (PTAPB BATAN)  
Frida Iswiningdyah (PTAPB BATAN)

#### **Accommodation and Transportation Division**

I Dewa Putu Hermida (PPET LIPI)  
Toni Kristiantoro (PPET LIPI)  
Sunaryo (PTAPB BATAN)

#### **Documentation Division**

Robeth V Manurung (PPET LIPI)  
Erry Dwi Kurniawan (PPET LIPI)  
Iqbal Syamsu (PPET LIPI)

**Publication Division**

Widhya Budiawan (PPET LIPI)

Natalita M. Nursam (PPET LIPI)

Slamet Santosa (PTAPB BATAN)

**Logistic Division**

Erlyta Septa Rosa (PPET LIPI)

Lilis Retnaningsih (PPET LIPI)

Shobih (PPET LIPI)

Elin Nuraeni (PTAPB BATAN)

Dadang Mulyadi (PPET LIPI)

Nanang Sudrajat (PPET LIPI)

Jojo Hidayat (PPET LIPI)

Sumarmo (PTAPB BATAN)

## PREFACE

Dear colleagues,

On behalf of the Organizing Committee of the 5<sup>th</sup> PPET-IMEN Joint Seminar on Microelectronic Devices, System and Instrumentation, I would like to thank all the participants for their participation during the 5<sup>th</sup> IMEN-LIPI Joint Seminar on Microelectronics Devices, Systems, and Instrumentations that was held in Yogyakarta on November 16-17, 2011.

I would like to specifically express my gratitude to the IMEN-UKM delegates lead by Prof. Burhan, the Deputy for Engineering Sciences, Indonesian Institute of Sciences (LIPI), Bpk. Dr. Ir. Syahrul Aiman, Head of the PTAPB BATAN, Bpk. Dr. Ir. Widi Setiawan, and our guests from UGM Bpk. Dr. Ari Setiawan, from PTAPB Bpk. Prof. Sudjatmoko, and from BTAPN Bpk. Ir. Suprpto.

The IMEN-LIPI Joint Seminar on Microelectronics Devices, Systems, and Instrumentations is an annual event held by IMEN-UKM and PPET-LIPI, to bring about the research and projects conducted by both institutions. Since 2007, the series of this joint seminar has been held in Bandung, Kuala Lumpur, Bali, Putra Jaya, and recently in Yogyakarta.

This proceeding consists of 29 scientific papers. Some of those papers was presented as oral presentation, and the rest was presented as poster presentation during the one-day seminar on 16 November, 2011. I truly hope that this seminar has been able to provide an interesting session and serve as an excellent forum for a live technical discussion.

Last but not least, this seminar would not have been possible without the contribution of the Speakers, the Authors, the Advisory Committee, and the member of the Organizing Committee. What makes this year different is that this joint seminar is actually being co-organized by PTAPB BATAN. Therefore, I would like to take this opportunity to express my sincere appreciation to all of them. All supports from everyone on the execution of the 5<sup>th</sup> IMEN-LIPI Joint Seminar on Microelectronics Devices, Systems, and Instrumentations are also greatly acknowledged.

Once again, thank you very much for your participation.

Bandung, December 27<sup>th</sup>, 2011

Organizing Committee

**Dr. Goib Wiranto**

## SCHEDULE

### The 5<sup>th</sup> Joint Seminar IMEN-LIPI on Microelectronics Devices, System and Instrumentation

**DAY 1, November 16<sup>th</sup>, 2011 – Inna Garuda Hotel**

Time	Session / Paper Title
07.30 – 08.00	Registration
08.00 – 08.10	Opening Remark <b>Dr. Goib Wiranto</b> (General Chairman / PPET – LIPI)
08.10 – 08.30	Welcome Speech <b>Dr. Ir. Syahrul Aiman</b> (Deputy Chairman of Engineering Science – LIPI)
08.30 – 08.45	Welcome Speech <b>Prof. Dato' Dr. Burhanuddin Yeop Majlis</b> (Director of IMEN – UKM, Malaysia)
08.45 – 09.45	Keynote Speaker <b>Dr. Ir. Widi Setiawan</b> (Head of PTAPB - BATAN)
09.45 – 10.00	Awarding Souvenirs and Photo Session
10.00 – 10.30	<b>Break – Morning Tea / Coffee + Poster Session</b>
10.30 – 10.45	<b>Paper 1</b> <b>Prof. Dato' Dr. Burhanuddin Yeop Majlis (IMEN-UKM)</b> <i>"Lab-on-Chip for Biological Fluids Analysis"</i>
10.45 – 11.00	<b>Paper 2</b> <b>Natalita Maulani Nursam S.T, M.Phil. (PPET-LIPI)</b> <i>"Application of Pt Counter-Electrode being Deposited on TCO-free Substrates for Dye-Sensitized Solar Cells"</i>
11.00 – 11.15	<i>Discussion session</i>
11.15 – 11.30	<b>Paper 3</b> <b>Prof. Dr. Ille C. Gebeshuber (IMEN-UKM)</b> <i>"Bioinspired Navigation and Water Vapor Detection Realized with MEMS"</i>
11.30 – 11.45	<b>Paper 4</b> <b>Ir. Slamet Santosa, MSc (PTAPB-BATAN)</b> <i>"Design of Instrumentation and Control Systems Automation Plasma Nitriding (PN) into Plasma Nitrocarburizing (PCN)"</i>
11.45 – 12.00	<i>Discussion session</i>
12.00 – 13.00	<b>Break – Lunch/Praying</b>
13.00 – 13.15	<b>Paper 5</b> <b>Assoc. Prof. Dr. Azman Jalar (IMEN-UKM)</b> <i>"Micromechanical Variation of Ball Bond Wire Bonding"</i>
13.15 – 13.30	<b>Paper 6</b> <b>Dr. Budi Mulyanti (UPI)</b> <i>"Electron Transmittance through Nanometer Thick Barrier of InGaN/GaN Structure in InGaN-based LED Using Matrix Transfer Method"</i>
13.30 – 13.45	<i>Discussion session</i>
13.45 – 14.00	<b>Paper 7</b> <b>Prof. Dr. Sahbudin Shaari (IMEN-UKM)</b> <i>" Comparison between Single Microring Resonator (SMR), Serial-Cascaded Microring-Resonator (SCMR) and Parallel-Cascaded Microring-Resonator (PCMR) Optical Filters Designs"</i>
14.00 – 14.15	<b>Paper 8</b> <b>Prof. Dr. Masbah R.T. Siregar</b> <i>"Dynamic of Temperature Effect to The Photon Absorption Process in Silicon Semiconductor"</i>
14.15 – 14.30	<i>Discussion session</i>
14.30 – 14.45	<b>Break – Evening Tea / Coffee + Poster Session</b>

---

---

14.45 – 15.00	<b>Paper 9</b> <b>Assoc. Prof. Dr. Akrajas Ali Umar(IMEN-UKM)</b> <i>"Ammonia Assisted-hydrolysis Process: An Alternative Approach for Vertical Array of Quasi-1D ZnO Nanorods on the Surface"</i>
15.00 – 15.15	<b>Paper 10</b> <b>Iqbal Syamsu, M.T. (PPET-LIPI)</b> <i>"Rancang Bangun Battery Control Unit untuk Panel Surya Menggunakan Maximum Power Point Tracking"</i>
15.15 – 15.30	<i>Discussion session</i>
15.30 – 16.00	<b>Closing Ceremony</b> <ul style="list-style-type: none"><li>- Closing Remark</li><li>- Souvenir</li></ul>

**DAY 2, November 17<sup>th</sup> 2011**

09.00 – 11.00	Visiting UGM
11.30 – 12.30	<b>Lunch</b>
12.30 – 14.30	Visiting BATAN
14.30 – 16.30	Visiting Prambanan Temple

## CONTENTS

<b><u>COMMITTEE</u></b>	ii
<b><u>PREFACE</u></b>	iv
<b><u>SCHEDULE</u></b>	v
<b>CONTENTS</b>	vii
01. <a href="#"><u>Bioinspired Navigation and Water Vapor Detection Realized with MEMS</u></a> <i>O. Futterknecht, M.O. Macqueen, S.B. Karman, S.Z.M. Diah, and Ille C. Gebeshuber</i>	1
02. <a href="#"><u>Application of Pt Counter-Electrode being Deposited on TCO-free Substrates for Dye-Sensitized Solar Cells</u></a> <i>Natalita M. Nursam, Lia Muliani, and Jojo Hidayat</i>	7
03. <a href="#"><u>Desain Pengembangan Otomasi Sistem Instrumentasi dan Kendali Plasma Nitridasi (PN) menjadi Plasma Nitrokarburasi (PCN)</u></a> <i>B.A. Tjipto Sujitno, Slamet Santosa, Suprpto, Widdi Usada, dan I Dewa Putu Hermida</i>	13
04. <a href="#"><u>Electron Transmittance through Nanometer Thick Barrier of InGaN/GaN Structure in InGaN-based LED Using Matrix Transfer Method</u></a> <i>Budi Mulyanti, Lilik Hasanah, Tuti Suartini, and Khairurrijal</i>	22
05. <a href="#"><u>Karakterisasi Lapisan Tipis Pt dan Pd Hasil Sputtering sebagai Doping pada Lapisan Sensitif WO<sub>3</sub></u></a> <i>Lilis Retnaningsih dan Erry Dwi Kurniawan</i>	28
06. <a href="#"><u>Rancang Bangun Oscilator Kristal 33.33 kHz untuk Frekuensi Pembawa pada Sistem Komunikasi Bawah Air</u></a> <i>Deni Permana dan Syamsu Ismail</i>	33
07. <a href="#"><u>Dye-Sensitized Solar Cells based on Carbon Nanoparticle Counter Electrode</u></a> <i>Lia Muliani, Natalita M Nursam, and Jojo Hidayat</i>	40
08. <a href="#"><u>Aplikasi LED (Light Emitting Diode) Sebagai Lampu Hemat Energi Menggunakan Switcher IC LNK302/304-306</u></a> <i>Bagus Edy Sukoco, Yaya Sulaeman, dan Iqbal Syamsu</i>	45
09. <a href="#"><u>Galvanostatic Electropolymerization of Conductive Polymer Ppy-PANi on Gold Electrodes for Uric Acid Biosensor</u></a> <i>Robeth Viktoria Manurung, Jojo Hidayat, and Rina Andriyani</i>	51
10. <a href="#"><u>Fabrication of Polymer Solar Cells Based in MDMO-PPV/PCBM Blends</u></a> <i>Erllyta Septa Rosa and Shobih</i>	56
11. <a href="#"><u>Rancang Bangun Alat Ukur Portabel Untuk Sensor Ion Nitrat</u></a> <i>Erry Dwi Kurniawan dan Robeth V. Manurung</i>	61
12. <a href="#"><u>Desain Dan Simulasi 20db Directional Coupler Untuk Aplikasi Radar</u></a> <i>Hana Arisesa, Mashury Wahab, dan Sri Hardiati</i>	68
13. <a href="#"><u>Pengaruh Temperatur <i>Burn Compact</i> pada manufaktur Magnet <i>Bonded NdFeB</i> dengan Teknik Kompaksi <i>Green Compact</i></u></a> <i>Tony Kristiantoro, Nanang Sudradjat, Widhya Budiawan, dan Tommy Hendrix</i>	72



---

14.	<a href="#"><u>Pengaruh Radar Absorbing Material terhadap Radar Cross Section</u></a> <i>Sulistyaningsih dan Mashury Wahab</i>	76
15.	<a href="#"><u>Analisis Struktur dan Fasa Komposit Magnet BaFe<sub>12</sub>O<sub>19</sub> – NdFeO<sub>3</sub></u></a> <i>Nanang Sudrajat, Wisnu Ari Adi, dan Widhya Budiawan</i>	82
16.	<a href="#"><u>Absorpsi Gelombang Mikro Bahan Magnetik SrO.6FeMn<sub>0.5</sub>Ti<sub>0.5</sub>O<sub>3</sub> pada Rentang Frekuensi 9–15 GHz</u></a> <i>Asep Yudi Hercuadi, Wisnu Ari Adi, dan Mashury</i>	89
17.	<a href="#"><u>Simulasi Pengukuran &amp; Analisa Pengaruh Penguatan Kanal Pilot terhadap Kualitas Jaringan Sistem CDMA 2000 1X</u></a> <i>Budi Herdiana, Moszes A Anggara, Asep Yudi Hercuadi, dan Arief Suryadi</i>	95
18.	<a href="#"><u>Penerapan DGS (Defected Ground Structure) Belah Ketupat pada Antena Mikrostrip Pemodelan Rectangular Beroperasi pada Frekuensi 3,3GHz -3,4 GHz</u></a> <i>Sri Hardiati, Yuyu Wahyu, dan Yustandi Achmad</i>	100
19.	<a href="#"><u>Peer-to-Peer Network Using JXTA Protocols for Supporting The Semantic Metadata</u></a> <i>Devi Munandar</i>	108
20.	<a href="#"><u>Rancang Bangun Penguat Daya untuk Frekuensi 2.5-2.69 GHz Berbasis Mikrostrip</u></a> <i>Pamungkas Daud, Ervin Tri Sasongko, dan Budi Prasetya</i>	115
21.	<a href="#"><u>Rancang Bangun Sensor Anisotropic Magneto Resistive di Atas Substrat Silikon</u></a> <i>Slamet Widodo, Nanang Sudrajat, Tony Kristiantoro, Widhya B., dan Goib Wiranto</i>	124
22.	<a href="#"><u>The Influence of Texturing Processes on The Quantum Efficiency of Solar Cell</u></a> <i>Shobih, P. Sagala, and Erlyta S.R</i>	135
23.	<a href="#"><u>Proses Rancang Bangun Cantilever dan Nanotip untuk Aplikasi AFM</u></a> <i>I Dewa Putu Hermida dan Goib Wiranto</i>	140
24.	<a href="#"><u>Pembuatan PA 1 Watt pada Frekuensi 3,3 GHz dengan Menggunakan Komponen SZA3044 untuk Aplikasi Penguat CPE WiMAX</u></a> <i>Yaya Sulaeman, Topik Teguh Estu, dan Tommy Hendrix</i>	145
25.	<a href="#"><u>Optical Filter Based on Asymmetric Parallel-Cascaded Microring-Resonator (APCMR)</u></a> <i>Dadin Mahmudin and Pamungkas Daud</i>	150
26.	<a href="#"><u>Design and Implementation of Guard Interval for OFDM System</u></a> <i>Suyoto and Agus Subekti</i>	157
27.	<a href="#"><u>Performance Evaluation for A Ground Based Radar</u></a> <i>Mashury Wahab and Daday Ruhiyat</i>	163
28.	<a href="#"><u>Pengembangan Biosensor Kolesterol Menggunakan Enzim Kolesterol Esterase dan Kolesterol Oksidase Amobil</u></a> <i>Hiskia, Robeth V.M., Lia Muliani, Linar Z.U., Erry D.K., Arief S.</i>	170
	<a href="#"><u>Authors Index</u></a>	175