

# Table of Contents

## Preface

## Chapter 1: Functional Ceramics and Semiconductors

|                                                                                                                                                                        |    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| <b>Growth of Ga<sub>2</sub>O<sub>3</sub> Nanowires by a Vapor Transport Method and their Optical Transmittance Spectra</b><br>S. Ozaki and Y. Nakahata                 | 3  |
| <b>Optical Absorption and Photoluminescence in Defect-Stannite-Type Semiconductor ZnGa<sub>2</sub>Se<sub>4</sub></b><br>S. Ozaki and S. Mukada                         | 10 |
| <b>Pore Structure of TiO<sub>2</sub>- Modified ZrO<sub>2</sub> Particles Prepared by the Glycothermal Method</b><br>F. Sugiyama, S. Hayashi and S. Iwamoto             | 17 |
| <b>Visible-Light Sensitive Photocatalytic Activity of FeO<sub>x</sub>- and P-Modified TiO<sub>2</sub> with Rutile Structure</b><br>T. Hirai, Y. Hayashi and S. Iwamoto | 23 |

## Chapter 2: Electrochemical Engineering

|                                                                                                                                                                                 |    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| <b>Increased Current Density of a Redox Flow Battery with a Carbon Paper Partially Modified by Porous Carbon Nanofibers</b><br>H. Ishitobi, S. Sugawara, K. Oba and N. Nakagawa | 31 |
| <b>Structure, Morphology and Catalytic Activity of PtRu/RGO Prepared by Different Processes</b><br>K. Dejima, H. Ishitobi and N. Nakagawa                                       | 38 |
| <b>Dependence of Ionic Conductivity on the Thickness of β-AgI Thin Film Prepared on Polyethylene Terephthalate</b><br>S.I. Furusawa and Y. Fukuda                               | 47 |

## Chapter 3: Biochemical Engineering

|                                                                                                                                                                                                                                                |    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| <b>Systematic Evaluation of Hybridization Property and Photo-Crosslinking Ability of Modified Oligonucleotides Containing Benzophenone-Bearing Glycol Nucleoside Analogs</b><br>M. Sunaga, D. Motegi, Y. Motegi, K. Shinozuka and T. Moriguchi | 57 |
| <b>Novel Long Peptide Antigens Containing MHC Class I and Class II Binding Sequences Designed from <i>Plasmodium falciparum</i> Enolase</b><br>H. Oku, Y. Hashimoto, T. Matsukawa, K. Shinozuka and Y. Oku                                     | 63 |

## Chapter 4: Signal and Data Processing

|                                                                                                                                                                                                                                           |    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| <b>Noise Filter Reducing Deformation in Digital Holography</b><br>Y. Takahashi, T. Okada, R. Sekiguchi and M. Fukushima                                                                                                                   | 71 |
| <b>A Study on Generating Fake Images of Podocyte Cells Based on Acgans with Restriction of Learning</b><br>Y. Ono, T. Matsuura, T. Matsuzaki, K. Hiromura and T. Aoki                                                                     | 76 |
| <b>Consideration on Input Signal for ADC Histogram Test in Short Time</b><br>Y. Zhao, A. Kuwana, Y.Y. Du, Y. Ozawa, Y. Sasaki, H. Kobayashi, T. Nakatani, K. Hatayama, K. Sato, T. Ishida, T. Okamoto and T. Ichikawa                     | 83 |
| <b>Electron Density and Effective Atomic Number Measurement by Using a Newly Developing Photon Counting CT System</b><br>H. Sakurai, K. Hoshi, Y. Harasawa, D. Ono, K. Zhang, A. Nagao, Y. Ohno, N. Sunaguchi, K. Suzuki and M. Torikoshi | 93 |

## **Chapter 5: Power Electronics and Electronics Circuits**

### **EMI Reduction of PFC Rectifier and LLC Converter with Automatic Output Ripple Improvement**

Y. Kobori, N. Oiwa, S. Katayama, A. Bustoni, Y.F. Sun, M.T. Tran, A. Kuwana and H. Kobayashi 103

### **Pulse Coding Controlled Switching Converters with Notch Frequency Generation in Noise Spectrum**

Y. Kobori, Y.F. Sun, M.T. Tran, A. Kuwana and H. Kobayashi 118

### **Frequency Stabilization and EMI Noise Reduction of COT Method Ripple-Controlled Switching Converters with Output Voltage Ripple Cancellation**

Y. Kobori, Y.F. Sun, M.T. Tran, A. Kuwana and H. Kobayashi 130

### **Automatic Current Balance for Multi-Phase Switching Converters with Ripple Control or Soft Switch**

Y. Kobori, J. Li, Y.F. Sun, M.T. Tran, A. Kuwana and H. Kobayashi 143

### **EMI Noise Reduction of DC-DC Switching Converters with Automatic Output Ripple Cancellation**

Y. Kobori, Y.F. Sun, M.T. Tran, A. Kuwana and H. Kobayashi 157

### **Pulse Coding Controlled Switching Converter with Notch Generation and its Conversion Voltage Ratio Analysis**

Y.F. Sun, Y. Kobori, A. Kuwana and H. Kobayashi 171

### **Design Proposal for Inductor Type Buck Converter in Bluetooth Receiver Chip with Overshoot Cancellation and Ripple Reduction Technique**

M.T. Tran, Y.F. Sun, Y. Kobori, A. Kuwana and H. Kobayashi 179

### **Pass-Band Gain Improvement Technique for Passive RC Polyphase Filter in Bluetooth Low-IF Receiver Using Two RC Band-Stop Filters**

M.T. Tran, N. Kushita, A. Kuwana and H. Kobayashi 192

## **Chapter 6: Machinery and Equipment**

### **Rehabilitation Assistance Systems for Three-Dimensional Gait Analysis Using Motion Capture Devices**

Y. Yuminaka, M. Fujii, S. Nakazato, S. Tsukagoshi, Y. Ikeda, M. Hasegawa and N. Wada 209

### **Numerical Simulation for the Starting Characteristics of a Wind Turbine**

A. Kuwana, X.Y. Bai, D. Yao and H. Kobayashi 215

### **Evaluation of a Network Switch with Whitelist-Based Packet Monitoring and Control in Hospital Networks**

O. Takaki, I. Suzuta, K. Torikai, Y. Saito, T. Kato, T. Sato, H. Endo and Y. Atarashi 222