

Table of Contents

Preface and Committees

Chapter 1: Material Science

A Study of Spin and Orbital Magnetic Form Factors of CeRh₃B₂ by X-Ray Magnetic Diffraction	
M. Ito, R. Nagayasu, T. Tadenuma, K. Suzuki, A. Sato, H. Adachi, Y. Sakurai and Y. Ōnuki	3
Observation of Magnetic Compton Profile of Interface Controlled Co/Pd Multilayer	
K. Suzuki, N. Go, S. Emoto, R. Yamaki, M. Itou, Y. Sakurai and H. Sakurai	8
Calculation of Compton Profiles for Rare Gases Using the DV-Xα Method	
K. Kobayashi and H. Sakurai	13
Calculation of Compton Profiles Using the DV-Xα Method for 14 Electron Diatomic Molecules	
K. Kobayashi and H. Sakurai	19
Ionic Conductivity of Li₂ZnTi₃O₈ Single Crystal	
S. Furusawa, H. Ochiai and K. Murayama	26
Effect of B₂O₃ or SiO₂ Fluxes on Morphology and Size of Pr-Doped CaTiO₃ Phosphor Particles and on their Photoluminescence Properties	
T. Kyōmen, R. Motani and M. Hanaya	31

Chapter 2: Chemical Science and Technology

Inhibition of Protein Aggregation: SAXS Study on the Role of the αC Region of Fibrinogen in the Fibrin Polymerization	
K. Kubota, K. Wakamatsu, N. Nameki and Y. Toyama	41
Synthesis and Properties of Molecular Beacon DNA Probe Bearing Novel Silylated Pyrene Derivative	
M.G. Uddin, T. Moriguchi, M. Ichimura and K. Shinozuka	47
Solvent-Free Synthesis of Functional Siloxanes Bearing 4-Trifluoromethylphenyl Group	
Y. Egawa and M. Unno	51
Release Behavior of W/O/W-Type Microcapsule	
M. Uehara, Y. Yoshinaga, T. Ogawa, Y. Maki, H. Takeno, T. Yamamoto, K. Ichikawa and T. Dobashi	55
Adsorption and Sensitizing Properties of Azobenzenes Having Different Numbers of Silyl-Anchor Groups in Dye-Sensitized Solar Cells	
K. Kakiage, M. Yamamura, T. Kyōmen, M. Unno and M. Hanaya	61
Carbon-Supported PtRuRh Nanoparticles as a Catalyst for Direct Ethanol Fuel Cells	
N. Nakagawa, T. Watanabe, M. Wagatsuma and T. Tsujiguchi	67
PAN Based Carbon Nanofibers as an Active ORR Catalyst	
M.A. Abdelkareem, D. Takino, T. Ishikawa, T. Tsujiguchi and N. Nakagawa	73
Heat-Treatment and Nitrogen-Doping of Activated Carbons for High Voltage Operation of Electric Double Layer Capacitor	
S. Shiraishi	80
Analytical Characteristic of Chromatography Device Using Dielectrophoresis Phenomenon	
M. Hakoda and T. Otaki	87

Chapter 3: Nano-Science and Technology

Pico-Newton Controlled Step-in Mode NC-AFM Using a Quadrature Frequency Demodulator and a Slim Probe in Air for CD-AFM	
S. Hosaka, T. Takizawa, D. Terauchi, Y. Yin and H. Sone	95

Crystal Growth Suppression by N-Doping into Chalcogenide for Application to Next-Generation Phase Change Memory Y. Yin and S. Hosaka	101
Influence of Phase-Change Materials and Additional Layer on Performance of Lateral Phase-Change Memories Y. Yin and S. Hosaka	106
Random-Access Multilevel Storage in Phase Change Memory by Staircase-Like Pulse Programming R. Kobayashi, T. Noguchi, Y. Yin and S. Hosaka	111
Guide Pattern Functionalization for Regularly Arranged PS-PDMS Self-Assembled Nanodot Pattern by Brush Treatment T. Akahane, M. Huda, T. Tamura, Y. Yin and S. Hosaka	116
Formation of 12-nm Nanodot Pattern by Block Copolymer Self-Assembly Technique M. Huda, T. Tamura, Y. Yin and S. Hosaka	122
Estimation of Nanometer-Sized EB Patterning Using Energy Deposition Distribution in Monte Carlo Simulation H. Zhang, T. Tamura, Y. Yin and S. Hosaka	127

Chapter 4: Photonics Device and Technology

Tunable Fiber Laser with Scanner Mirror Y. Takahashi and T. Oginosawa	135
Optically Controlled Light Propagation in Dye-Doped Nematic Liquid Crystals with Homogeneous Alignment T. Sasaki, K. Miura, H. Ono and O. Hanaizumi	142
Fabrication of Polymer Optical Waveguides for the 1.5-μm Band Using Focused Proton Beam K. Miura, Y. Machida, M. Uehara, H. Kiryu, Y. Ozawa, T. Sasaki, O. Hanaizumi, T. Satoh, Y. Ishii, M. Kohka, K. Takano, T. Ohkubo, A. Yamazaki, W. Kada, A. Yokoyama, T. Kamiya and H. Nishikawa	147

Chapter 5: Novel Measurement and System Technology

Phantom Experiments on Shear Wave Velocity Measurement by Virtual Sensing Array Spectrum Estimation T. Miwa, K. Kanzawa, R. Tomizawa and Y. Yamakoshi	153
Simulator for Application of Shear Wave Velocity Measurement System to Arbitrary Tissue Elasticity Distribution T. Miwa and Y. Yamakoshi	161
Microforce Material Tester Using Small Pendulum II J. Ozawa, A. Takita, T. Azami and Y. Fujii	169
Development of Material Tester Using Pendulum H. Ebara, A. Takita, T. Azami and Y. Fujii	176
A Design Method for Control System to Attenuate Unknown Input Andoutput Disturbances Using Disturbance Observers K. Yamada, T. Sakanushi, I. Murakami, Y. Ando, Y. Nakui and D.Z. Gong	182
The Parameterization of All Disturbance Observers for Discrete-Time Plants with Input Disturbance K. Yamada, I. Murakami, Y. Ando, T. Hagiwara, D.Z. Gong, Y. Nakui and T. Sakanushi	197
A Design Method for Internal Model Controllers for Multiple-Input/Multiple-Output Unstable Plant N.T. Mai, K. Yamada, I. Murakami, Y. Ando, T. Hagiwara, T. Hoshikawa and M. Hosoya	210
A Design Method for Two-Degree-of-Freedom Modified Smith Predictors for Multiple-Input/Multiple-Output Time-Delay Plants N.T. Mai, K. Yamada, Y. Ando, I. Murakami and T. Hoshikawa	221
Study on the Model Feedback Control System for a Class of Non-Minimum Phase Systems N.T. Mai, K. Yamada, T. Moki, T. Hagiwara and F. Kanno	234

The Parameterization of All Plants Stabilized by Proportional Controller Formultiple-Input/Multiple-Output Plant	
T. Hagiwara, K. Yamada, S. Aoyama and A.C. Hoang	246
A Design Method for Two-Degree-of-Freedom Multi-Period Repetitive Control Systems with the Specified Frequency Characteristic	
Z.X. Chen, K. Yamada, N. Nakazawa, I. Murakami, Y. Ando, T. Sakanushi, T. Hagiwara, N.L.T. Nguyen and S. Yamamoto	255

Chapter 6: Information and Communication Engineering

Architecture of High-Efficiency Digitally-Controlled Class-E Power Amplifier	
J.N. Ye, Z. Nosker, K. Wakabayashi, T. Yagi, O. Yamamoto, N. Takai, K. Niitsu, K. Kato, T. Ootsuki, I. Akiyama and H. Kobayashi	273
Single Inductor DC-DC Converter with Independent Bipolar Outputs Using Charge Pump	
N. Takai, K. Takahashi, H. Yokoo, S. Miwa, K. Tsushida, H. Iwase, K. Murakami, H. Kobayashi, T. Odaguchi, S. Takayama, T. Oomori, I. Nakanishi, K. Nemoto and J. Matsuda	285
A Dicode Signaling Scheme for Capacitively Coupled Interface	
Y. Yuminaka and K. Kawano	296