

# Table of Contents

## Preface and Organization Committee

## Chapter 1: Quantum, Nano, Micro Materials and Technologies

|                                                                                                                                                                                                                      |    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| <b>Aluminium Induced Crystallization of Amorphous Silicon via Solution Derived Catalyst</b><br>I.Y.Y. Bu                                                                                                             | 3  |
| <b>Arbitrated Quantum Signature Scheme with Message Bits Intertwined</b><br>N. Chen, D.X. Quan, C.X. Pei and H. Yang                                                                                                 | 7  |
| <b>Ultra-High Photon Energy Absorption by Gold Nanoparticles Arrays</b><br>Y. Bilotsky and M.M. Gasik                                                                                                                | 14 |
| <b>Synthesis of Copper Nanoparticles at Room Temperature Using Hydrazine in Glycerol</b><br>H.R. Ong, M.R. Khan, R. Ramli and R.M. Yunus                                                                             | 21 |
| <b>Formation of Giant SiGe Crystals on Insulator by Self-Organized-Seeding Rapid-Melting Growth</b><br>R. Matsumura, H. Chikita, T. Sadoh and M. Miyao                                                               | 27 |
| <b>Electron Beam Lithography for Fabrication of Nanophase-Change Memory</b><br>Y. Yin, T. Itagawa and S. Hosaka                                                                                                      | 30 |
| <b>Synchrotron XANES Spectra of Superparamagnetic Iron Oxides Synthesized by Ultrasonic-Assisted Co-Precipitation</b><br>W. Tangwatanakul, C. Sirisathitkul, N. Muensit, T. Monnor and R. Yimnirun                   | 36 |
| <b>Analysis of Tunneling Phenomenon and Electron Confinement in Quantum Nanowire</b><br>U.S. Sonawane, E.P. Samuel, C. Kasar and D.S. Patil                                                                          | 40 |
| <b>Effect of Post Annealing Temperature on Cerium Doped ZnO Nanostructures</b><br>C.K. Kasar, U.S. Sonawane and D.S. Patil                                                                                           | 45 |
| <b>Investigate Mechanical Behavior of Gold Nanowire with Defect</b><br>J.L. Tsai and C.F. Hong                                                                                                                       | 49 |
| <b>Researching Influence of IBAD PLD Parameters on Properties of Nanocrystalline ZnO Thin Films</b><br>O.A. Ageev, D.A. Golosov, E.G. Zamburg, A.M. Alexeev, Z.E. Vakulov, D.E. Vakulov, A.V. Shumov and M.N. Ivonin | 55 |
| <b>Influence of Polymer Additive on Synthesis of ZnO Nanoparticle by Precipitation Method</b><br>R. Suntako                                                                                                          | 60 |
| <b>Preparation of ZnO Nanosol Dispersed in Aqueous Medium and its Dispersion Characteristics</b><br>H.H. Lim, S.H. Lee, H.M. Lim and D.S. Kim                                                                        | 66 |
| <b>Effect of CO<sub>2</sub> Flow Rate on the Synthesis Nanosized Precipitated Calcium Carbonate, PCC</b><br>O. Nooririnah, A.A. Muhamad, Y. Yusliza, A. Manap and M.J. Md Ashadi                                     | 72 |

## Chapter 2: Material Science and Technology

|                                                                                                                                                                           |     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Characteristics of Lead-Free Machinable Brass of Powder Metallurgy Cu-40 Mass%Zn/1.0 Mass% mg with Graphite Particles</b><br>H. Imai, H. Atsumi, S.F. Li and K. Kondoh | 79  |
| <b>Studies on the Microstructures and Properties of Broussonetia Papyrifera Fiber</b><br>T.H. Zhang, L. Cheng, M. Guo and Y.M. Zhang                                      | 86  |
| <b>Effect of Three Arm Polystyrene on Polystyrene Film Stability</b><br>S. Sangjan                                                                                        | 92  |
| <b>Pattern Formation of Silicon Oxide Thin Film with InkMask</b><br>T. Ito, Y. Ota and K. Nishioka                                                                        | 98  |
| <b>Hg Ion Detection with Monolayered Graphene and Gold in a Microfluidic Channel</b><br>S.H. Lee, W.S. Jung and S.H. Kim                                                  | 102 |

|                                                                                                                                                                                                                                                                    |     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Investigation of Space Charge Distribution of MgO/XLPE Composites Depending on Particle Size of MgO as Inorganic Filler</b><br>D.S. Kim, D.H. Lee, Y.J. Kim, J.H. Nam, S.T. Ha and S.H. Lee                                                                     | 108 |
| <b>Optimization of ZnO-Coated TiO<sub>2</sub> Working Electrode and Application in a Dye-Sensitized Solar Cell</b><br>C.S. Chou, T. Watanabe, Y.H. Huang and P. Wu                                                                                                 | 117 |
| <b>The Effects of Nitrogen Concentration in TiN<sub>x</sub> and the Thickness of HfSiO<sub>x</sub>N to the Tunneling Currents in Isotropic TiN<sub>x</sub>/HfSiO<sub>x</sub>N/SiO<sub>2</sub>/Si(100) Capacitors</b><br>F.A. Noor, M. Abdullah and K. Khairurrijal | 121 |
| <b>Synthesize of Sr<sub>x</sub>La<sub>1-x</sub>TiO<sub>3</sub> Visible Light Responses Photocatalyst Films for the Water-Splitting Reaction by Pulsed Laser Deposition</b><br>S. Kurumi, M. Saito, T. Kurihara and K. Suzuki                                       | 125 |
| <b>Thermal Stability of Tilt Grain Boundaries in Graphene</b><br>J.P. Mendez, F. Macias and M.P. Ariza                                                                                                                                                             | 129 |
| <b>CuO<sub>x</sub> Films for NO<sub>2</sub> Detection: Microstructural Characterization</b><br>T.N. Myasoedova, G.E. Yalovega, N.K. Plugotarenko, M. Brzhezinskaya, V.V. Petrov, T.A. Moiseeva and V.A. Shmatko                                                    | 133 |
| <b>Low Temperature (~300°C) Epitaxial Growth of SiGe by Liquid-Solid Coexisting Annealing of A-GeSn/Si(100) Structure</b><br>H. Chikita, R. Matsumura, T. Sadoh and M. Miyao                                                                                       | 137 |
| <b>Optimization of BiFeO<sub>3</sub>/MFIS Capacitors Doped Niobium by Using Taguchi Method</b><br>K.C. Lin, C.H. Ko, M.J. Twu, P.C. Juan, H. Sekiguchi and C.H. Chou                                                                                               | 141 |
| <b>GaN MSM UV Sensor Using Multi-Layer Graphene Schottky Electrodes</b><br>C.J. Lee, H.G. Cha, S.K. Hong, S.H. Doh, Y.S. Koo, B.J. Cho and S.H. Hahm                                                                                                               | 146 |

### **Chapter 3: Mechanic Manufacturing System**

|                                                                                                                                                                                           |     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Experimental Study on Temperature during Wire Saw Slicing</b><br>C.Y. Yao, Z.H. Xu, W. Zhang, Q.F. Zhang and W. Peng                                                                   | 153 |
| <b>Vacuum-Free Continuous Fabrication for Forming Narrow Bus Wires</b><br>J.H. Lee, J.H. Choi, S.R. Lee, C.Y. Lee, C.W. Park, G.M. Kim and M.K. Kwak                                      | 158 |
| <b>Analysis and Optimization of a Hydraulic-Feedback Proportional Throttlecartridge Valve</b><br>W. Liu, J.H. Wei and B. Hu                                                               | 162 |
| <b>FEM-Based Modeling to Simulate Thermal Deformation Process for High-Speed Ball Screw Drive Systems</b><br>A.S. Yang, S.Z. Chai, H.H. Hsu, T.C. Kuo, W.T. Wu, W.H. Hsieh and Y.C. Hwang | 171 |
| <b>Optimal Control of the Passive and Novel Docking Mechanism</b><br>W.S. Jung, S.H. Lee and S.H. Kim                                                                                     | 180 |

### **Chapter 4: Information Technologies and Computational Procedures in Engineering Researches and Design**

|                                                                                                                                                                                   |     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>An Energy Optimization Approach for Wireless Sensor Network Based on Complexity Control Algorithm</b><br>T. Dong, C.X. Fan, Z.G. Wen and Y. Ji                                 | 187 |
| <b>Bio- and Psychophysical Audiology as a New Direction of Computer Technologies: The Substantiation and Possibilities</b><br>E.L. Ovchinnikov, V.V. Ivanov and Y.V. Ovchinnikova | 194 |
| <b>An Image Transmission System Utilizing Chaos-Based Watermarking Technique</b><br>B.S. Zhan and D. Liu                                                                          | 203 |
| <b>Single Machine Scheduling with Resource-Dependent Ready Times and Positional Deterioration Effect</b><br>D. Wang and N. Yin                                                    | 207 |
| <b>Analysis and Calculation of the Strain Field Disturbance Caused by Dislocation Migration</b><br>M.Q. Zhang and S.W. Yang                                                       | 212 |
| <b>Application of Computer Technology in the Simulation Process of Machine Design</b><br>Y.W. Zhu and Y. Xu                                                                       | 217 |

|                                                                                                                                                                                 |     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Enhanced Tight Finite Key Scheme for Quantum Key Distribution (QKD) Protocol to Authenticate Multi-Party System in Cloud Infrastructure</b><br>R. Khalid and Z.A. Zulkarnain | 220 |
| <b>Application of Z Transform in the Design of One-Dimensional Photonic Crystal</b><br>J. Zhang, W.P. Fu and R.J. Zhang                                                         | 225 |
| <b>Finite Element Analysis of Stress Concentration at Rounded Crack Tip with Different Physical Parameters</b><br>M.K. Yeh and C.M. Kao                                         | 230 |
| <b>The Analysis of Channel Stress Induced by CESL in N-MOSFET</b><br>M.J. Twu, W.C. Kao, K.C. Lin, K.D. Chen, Y.T. Kua and C.H. Liu                                             | 235 |
| <b>Numerical Analysis of Junction Point Pressure during Droplet Formation in Y-Junction Microchannel</b><br>Z.M. Liu and L.K. Liu                                               | 241 |

## **Chapter 5: Related Topics**

|                                                                                                                                                       |     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Bending Angle Characteristics of SPFC1180Y Steel by the Laser Irradiation Position</b><br>H.W. Lee, S.M. Park and S.J. Park                        | 249 |
| <b>Compact Differential Dual-Frequency Antenna Based on Metamaterial</b><br>L.P. Han, L.F. Hao, R.B. Ma and W.M. Zhang                                | 254 |
| <b>Influences of Surface Roughness of Steel Substrate on Bond Strength of Fiber Woven Composite</b><br>Z.N. Jia, C.Z. Hao and C. Han                  | 258 |
| <b>Extraction of Parasitic Parameters on Surface Acoustic Wave Device</b><br>R.Y. Ro, Z.X. Lin, S. Wu and C.H. Keng                                   | 264 |
| <b>Analysis on the Core Theory of Mechanical Abstractive Design</b><br>X. Yang                                                                        | 268 |
| <b>Solution of Generalized Jaynes-Cummings Model for many Particle Systems</b><br>N.N.J. Bogolubov, M. Rasulova and I.A. Tishabaev                    | 272 |
| <b>The Facet Passivation Characteristic of 940nm Semiconductor Laser</b><br>Z.J. Li, X.G. Zheng, T. Li, Y. Qu, B.X. Bo, G.J. Liu, X.H. Ma and M. Wang | 278 |