

Table of Contents

Preface, Committees and Sponsors

Chapter 1: Research and Design of Machinery in Energy Industry and Energy Technologies for Industry

Prediction of Vehicle Fuel Consumption Model Based on Artificial Neural Network A. Amer, A. Abdalla, A. Noraziah and A.A.C. Fauzi	3
DeNOx Technology Selection and Optimal Design of SNCR System for a 300MWe CFB Boiler W.G. Huang, J.J. Li and H.R. Yang	7
Design and Development of 850t/h CFB Boiler with Energy Saving Technology X.H. Ren, K.T. Hu, J.C. Zhang, A.C. Liu and H.R. Yang	13
Evaluation the Role of Multi-Stage Compression and Waste Heat Recovery on Compressed Air Energy Storage System Performance Z.G. Guo, G.Y. Deng, P. Chu and G.M. Chen	19
Appropriate Electric Energy Conservation Measures for Big Mosques in Riyadh City A.M. Al-Shaalan, A. Wakeel and A. Alohalay	24
Bayesian Algorithm Based on Airborne Power Supply System X. Jiang and J.Y. Hua	31
Study on the Cooling System of Super-Capacitors for Hybrid Electric Vehicle Z.P. Xia, C.Q. Zhou, D. Shen, H.J. Ni, Y.N. Yuan and L. Ping	37
A Charging Management of Electric Vehicles Based on Campus Survey Data B. Yagcitekcin, M. Uzunoglu and A. Karakas	43
Back-EMF Position Detection Technology for Brushless DC Motor H.X. Wu, Z.Y. Qi, J.G. Zheng and S.M. Zhou	49
Stress State of Turbine Blade Root and Rim Considering Manufacturing Variations Q. Zhou and W. Zhao	56
Analysis on a Gas Turbine Sealing Disk Structure and Material Strength B.W. Liu, J.J. Wang and H.Y. Yuan	60
A Kind of Adjustable Electric Heating Pipe Power Electrode Preparation Equipment G. Li and X.L. Zhu	71
Fracture Failure Mechanism Analysis of LP Second Stage Blades of a Gas Turbine B.W. Liu, J.J. Wang and H.Y. Yuan	76
Effect of Temperature Cycling on Stress Relaxation Behavior of Electrical Connector Contacts Y.Y. Luo, L.X. Wang, K. Li, M.M. Lei, G.J. Liu, H.X. Liu, X.N. Li, Y.L. Ren and X.J. Zhang	86
Loss Analysis and Calculation Method of the Switched Reluctance Motor H.X. Wu, K.Q. Zhao, S.M. Zhou and J.G. Zheng	90
Research on Characteristics of Variable Pitch Offshore Wind Turbine L. Lu and X.Z. Zhang	96
Analysis of Plastic Optical Fiber Based Daylight System Suitable for Building Applications M.S. Maskarenj, M. Avasare and P.C. Ghosh	101
Design and Performance of Horizontal Axis Wind Turbine Using Blade Element Momentum Theory (BEMT) A.M. Bufares and M.S. Elmnefi	106
Optimization of Multi-Pole Permanent Magnet Synchronous Generator Based 8 Blade Magnetically Levitated Variable Pitch Low Speed Vertical Axis Wind Turbine M.S.A. Khan, R.K. Rajkumar, R.K. Rajkumar and C.V. Aravind	113
Effects of Double Glazing on the Performance of a Solar Thermal Collector N. Ihaddadène, R. Ihaddadène and A. Mahdi	118
Extended Modulation Index with more Eliminated Low Order Harmonics at Cascaded Multilevel Inverters H.A. Aalami and R. Salehi	123

Thermal Structure Analysis and Optimization of the Feeding System of the Permanent Magnet Linear Synchronous Motor	
J.H. Jiang, G.Y. Ye and Y.T. Xu	128
Experimental and Validation of Photovoltaic Solar Cell Performance Models in Desert Climate	
N. Aoun, R. Chenni and K. Bouchouicha	135
Simulation on Building Energy Consumption for a Residential Building	
Z.Q. Liu, Z.J. Zuo and L. Li	143
An Estimation Strategy of Lithium Battery SOC Based on Gauss-Hermite Filter	
J.Z. Zhou and W.Y. Jian	147

Chapter 2: HV Power Lines Technologies

Research on Prediction Model of Discharge Voltage under High-Altitude Condition Based on BP ANN	
X.Q. Luo, F. Huo and Q.M. Ye	153
Test Research on Phase-to-Ground Air-Gap Discharge Characteristics of UHV Substation	
Q.M. Ye, L. Xie, X.Q. Luo and F. Huo	162
The Simulation Study of Transformer Inductive Oscillating Switching Impulse Voltage Generation	
J.C. Liang, T.Z. Wang, K.N. Wang and J.H. Li	169
Research on the Failure Prediction of Electrical Connectors at High Temperature	
Y.Y. Luo, K. Li, M.M. Lei, L.X. Wang, H.X. Liu, Y.L. Ren and X.N. Li	173
Research on an Accident of 500 kV Gas Insulated Transmission Line	
H. Xiong, H. Jiang, B. Zhou and G. Zhou	178
Management System of Transmission Line Passage Protection Based on Web Map Service	
H.L. Jiang, S.Q. Zheng and N. Li	182
PD Characteristics in Transformer Oil under AC Condition	
J.C. Liang, T.Z. Wang, K.N. Wang and J.H. Li	186
Research on Low-Temperature Reliability of Electrical Connectors	
Y.Y. Luo, Y.J. Wang, L. Liu, X.W. Liu, Z.P. Ma, Z. Wang and S.M. Zheng	190
Study on Failure Frequency of Sensitive Equipment Caused by Voltage Sag	
W. Cai, H.M. He, J.W. Wang, J. Suo and C.L. Wu	195
Evaluation of Voltage Sag Mitigation by Resonant Grounding Comparing to Existing Direct Grounding in Provincial Electricity Authority	
S. Songsiri and S. Sirisumrannukul	201
Research on an Online Monitoring and Diagnosis System of High-Voltage Circuit Breaker	
P.H. Ni and W. Wang	212
Assessment of Power Transformers Technical State Based on Technical Diagnostics	
A.I. Khalyasmaa, S.A. Dmitriev and S.E. Kokin	218
A Novel Research and Implementation of Dynamic Voltage Restorer	
S.P. Pei and F.Z. Wu	223
Parameter Design and Dynamic Characteristic Analysis of Magnetic Force Actuator Based on Visual Basic Interface Programming	
Y.H. Bi, E.Y. Dong, G.X. Yin, J.Y. Xu and M.W. Liu	227

Chapter 3: Innovative Materials and Chemical Technologies for Power Industry and Energy Systems

Study of $\mu\text{-Si:H}$ Thin Films Prepared by RF-PECVD	
X.J. Wang	235
An Assessment of Interatomic Potentials for Yttria-Stabilized Zirconia	
C. Yin, F. Ye, C.Y. Yin, D.R. Ou and T. Mori	239
Direct Electrochemical Reduction of Solid TiO_2 in $[\text{BMIM}]\text{BF}_4\text{-CaCl}_2$ Ionic Liquid	
J.C. Mu, X.D. Zhang and L.P. Zhang	248
Synthesis of $\text{Ni}_{0.6}\text{Cu}_{0.4}\text{Fe}_2\text{O}_4$ Ferrite Fine Powder Using Egg White Method	
L. Wang, Z.D. Li, Y. Liang and K.Y. Zhao	253

Synthesis of Fe₃O₄ Nanotubes under Assistance of Microwave by Tuning Chemical Deposition Mechanism and its Magnetic Properties R.J. Pan and Z.L. Li	258
Corrosion Resistance of Sintered NdFeB Magnets with Various Surface Coatings E. Chen, K. Peng, W.L. Yang, J.J. Zhu, D.Y. Li and L.P. Zhou	263
Preparation and Characterization of Conductive Filler Used for Electromagnetic Shielding Materials R. Wang, H. Yang, J.L. Wang, Z.Q. Ma and F.X. Li	268
Analyzing of Energy Band and Density of States of ZnO Z.H. Lan, M.Y. Hou, H.Y. Wang and Y.G. Ji	273
Fabrication of Porous Titanium Dioxide Film by Oxidization of Titanium Foil and its Photocatalytic Performance for Degradation of Methyl Orange R.J. Pan	276
Characterization of TC-3 Glass/Fused Silica Composites for LTCC Applications X.G. Miao, X.G. Zhang, X.W. Fang, F. Ghezzi, Z.Y. Zhao and R.P. Liu	281
New Method to Fabrication 3D Micro-Device Structures A. Emhemmed, A. Kriama, O. Terfaas and G. Green	286
Polymer Stabilized Undoped and Copper Doped Cadmium Sulphide Nanoparticles: Polymer Crosslinked, Optical, and Thermal Stability A.R. Mandal, S. Volchematiev, D. Leybo, D. Muratov and D.V. Kuznetsov	291
Preparation and Gas Sensing Properties of Microrod ZnO Materials L.F. Yang, Y.L. Wang and Q.H. Wang	297
Design of Photonic Crystals Waveguide Using Microfluidic Infiltration F. Bougriou, T. Boumaza and M. Bouchemat	301
Compact Modeling of Lightly Doped Nanoscale DG MOSFET Transistor B. Smaani, M. Bella and S. Latreche	306
Controlled Morphologies of Nanostructured ZnO Films by MOCVD Method B. Ahmmad, K. Kanomata and F. Hirose	311
Optimization of Abrupt Profile of Germanium in Si/SiGe Heterojunction Bipolar Transistor Specified for Radio Frequency Range Systems M. Lakhdara, S. Latreche and C. Gontrand	316
Graphene/Nylon-6 Chemiresistor Sensor for Trimethylamine Gas Sensing R.A.G. Rañola, J.M. Kalaw and F.B. Sevilla	321
Preparation and Analysis of Novel Thermoelectric Material (Sr_xCa_{1-x})₃Co₄O₉ J. Wang, L.P. Zhang and Y. Li	326
Effects of Surface Treatment on the Performance of PEDOT: PSS/n-GaN Schottky Solar Cells Q. Feng, K. Du, Y.K. Li, P. Shi and Q. Feng	331
The Study about Combustion and Emission Characteristics of n-Butanol/Diesel Fuel Mixture J. Wu, L.L. Zhu, Z.C. Wang, B. Xu and H.M. Wang	335
Effect of Partial Pressure of Precursors on Atomic Layer Deposited Zinc Oxide Films as TCO Material in Solar Cell Application S. Sinha and S.K. Sarkar	341
Effect of V/Mo Ratio on Structural Properties of V_xMo_(1-x)O_y Nanoparticles Used as Alkaline Fuel Cell Catalyzer B. Beyribey, B. Saygi, S.E. Acikyildiz, L. Culcu, B. Mutlu, D.S. Vardar and H. Sarac	346
Biodiesel Production from Waste Vegetable Oils over MgO/Al₂O₃ Catalyst T. Sithole, K. Jalama and R. Meijboom	350
Energy Requirement Estimates for Two Step Ethanolysis of Waste Vegetable Oils for Biodiesel Production N. Ligeris and K. Jalama	356
Hot-Corrosion Behavior of Modified YSZ Thermal Barrier Coating Y. Wang, L.J. Chen, H. Suo and Y.C. Meng	361
Three Dimensional Computational Fluid Dynamics Modelling of High Temperature Polymer Electrolyte Fuel Cell D. Singdeo, T. Dey and P.C. Ghosh	365

Preparation and Electrochemical Performance of Praseodymium Doped SnO₂ Particles as Negative Electrode Material of Lithium-Ion Battery X.Z. Liu, G.J. Lu, X.Z. Liu, J. Chen and H.Z. Xiao	370
Atomic Layer Deposition of Molybdenum Oxide for Solar Cell Application D.K. Nandi and S.K. Sarkar	375
Biodiesel Production Unit from Lab Scale to Industrial Pilot Plant: Material and Energy Balance S. Awad and M. Tazerout	380
Simulation of South African Corncob Gasification with Aspen Plus: A Sensitivity Analysis A. Mavukwana, K. Jalama and K. Harding	386
A New Type Mold Shell Used for Turbine Blade Production S.C. Sun, W.T. Xu, Y. Zhang, H.B. Guo, R.H. Zhang, N.Q. Shi and Y.T. Zhao	392
Electromagnetic Materials Design for the Enhancement of the Microwave Power Transmission through Polymeric Slabs F. Ghezzi, X. Yi, X.G. Miao, Z.Y. Zhao and R.P. Liu	397

Chapter 4: Innovative Design, Engineering Management and Automation of Modern Energy Systems

A Survey on Single-Phase Faulty Line Selection Techniques for Small Current Grounding System in Medium-Voltage Grid Y. Tao and Y. Juan	407
Research on Separation of PD Signals Originated from Different Sources in Substation Y. Yang, Q. Wang, G.L. Wu, K. Pang, Q.B. Xiao and P.L. Gao	412
An Advanced Modeling and Control Approach for Frequency Regulation in Electric Energy Systems with New Resources L. Guo, Y. Zhou, L. Deng, L. Chen and J. Liu	418
A New Differential Relay Framework for Power Transformer R. Bouderbala and H. Bentarzi	426
Fuzzy Based Intelligent Approach to AGC of Multi-Area Multi-Unit Power System with SMES under Random Load Disturbances S. Suhag and A. Swarup	431
The Research and Implementation of the Mid-Frequency Power S.P. Pei and B.R. Wu	439
The Research of CDEGS in Defect Diagnosis for Grounding Grid A. Ren, Q.Q. Li, R. Liu, Y.F. Qi, X.J. Liu, L.X. Wang, G.D. Han and Y.B. Liang	443
Impact of Gas Turbine Frame Size on Efficiency of Gas Turbine Power Plants M. Basha, S.M. Shaahid and L. Al-Hadhrani	447
Power Management of Server Farms G. Iazeolla and A. Pieroni	453
Location and Size of Distributed Generation Using Ant Colony Optimization J. Mendoza, M. López and A. Delgado	460
Optimal Operation of Micro-CHP Systems for a Single-Family House in Italy L. Mongibello, N. Bianco, M. Caliano, G. Graditi and M. Musto	467
An Experimental Setup Design to Evaluate Power Generation Performances of TECs under Different Temperatures E. Akarslan, S.M. Çınar, F.O. Hocaoglu and F. Serttaş	473
Distribution Network Reconfiguration Optimization Method for Reducing the Voltage Sag Impact on Important Loads H.L. Jiang, Y.W. Wang, J.P. Wang and Z. Zhang	478
Study of Super Short-Term Bus Load Forecasting Model Based on Similar Ranges D.X. Niu, Y.C. Chen, J. Fan, Q.G. Ma and Q.L. Tan	482
Single-Ended Forward Switching Power Supply Design Based on UCC2800 PWM Controller W. Yang, L.J. Qiu and Y.X. Wang	489
Disturbance Elimination of Buck-Converter with Resonant LPF via ILQ Servo-System S. Shiina, S. Aumted and H. Takami	493

The Design of Airport Flood Lighting Energy-Saving Control System L. Yang, K. Li, G. Yang and X.C. Zhang	499
Study on Frequency Characteristics of Valve in Heat Metering Control System Y.R. Pang, X.R. Li, Y.J. Liang, L.D. Fang, S.S. Cao and Z.B. Song	503
Study on the Resistance Characteristics of Heat Metering System Based on Electric Valve D.J. Gong, Y. Zhang, X.R. Li, L.D. Fang, Z.H. Wei and N. Zhao	507
Copper Electrolytic Cycle Reverse Current Control System D.J. Liu, L.Y. Zhang, G.D. Chen, H.D. Duan and C. Liu	511
The Study of CAN Buffer Multiplexing Technique and its Realization in TTC200 Controller Y.B. Yu, D.Y. Bi, W. Wang and Z. Cai	515
Development of the Low Cost Harmonic and Power Instrument by Using Fourier Series Method with Microcontroller N. Watjanatepin, C. Boonmee and Y. Kantaphayao	519
Imprecise Risk Assessment of Power System X.J. Qi, X.T. Peng and X.Y. Huang	526
Power Equipment Technical State Assessment Principles S.A. Dmitriev and A.I. Khalyasmaa	531
The Optimal Operation of Super High Head Hydropower Station with Multiple Water Supply Modes R.Y. Ma, J.L. Lin, L. Song and X.C. Xie	536
Application and Contrast Analysis of BP and RBF Neural Network in Short-Term Wind Power Prediction W.H. Li, Q. Xiao, J.L. Liu and H.Q. Liu	544
An Analysis of Wind Speed Distribution at Benina, Benghazi, Libya M. Salem Elmnefi and A.M. Bofares	550
Geodynamic Monitoring in Area of Nuclear Power Plant R.V. Sharapov and O.R. Kuzichkin	556
Potential of Renewable Energies Integration in an Essential Oils Extraction Process E.H. Benyoussef and R. Bessah	561
Performance Analysis of Integrated Solar Combined Cycle Power Plant for Dhahran, Saudi Arabia Y.S. Sanusi, P. Gandhidasan and E.M.A. Mokheimer	568
Comparison of Three Methods for Weibull Distribution in Calculating Wind Energy Potential R. Ihaddadene, N. Ihaddadene and M. Mostefaoui	574
Application of Advanced MPPT Control for Grid-Connected Wind Power Generation System W. Wang	579
Guangdong, a Potential Province for Developing Hot Dry Rock Geothermal Resource A.D. Wang, Z.X. Sun, B.Q. Hu, J.H. Liu and C.D. Liu	583
Optimal Distribution of Gases in Integrated Iron and Steel Works Q. Zhang, Y.H. Shen, Y.L. Wang and H.L. Li	586