

# Table of Contents

## Preface, Organizers and Committees

## Chapter 1: Sustainable Development of Transport and Transport Infrastructure

<b>Evaluation of the Effect of Fuel Properties on the Fuel Spray and Jet Characteristics in a HGV DI Diesel Engine Operated by Used Cooking Oils</b> B. Dizayi, H. Li, A.S. Tomlin and A. Cunliffe	3
<b>Influence of Passenger Load on Diesel Bus Emissions</b> Q. Yu, T.Z. Li, Y.M. Ren, N. Zhu and F. Qian	13
<b>Modeling Traffic Demand of Tourist Areas Based on a Joint Prediction Model</b> G.Q. Jing and R. Fan	19
<b>Comprehensive Evaluation of Advanced Public Transportation System Based on the Matter Element and Combination Weight</b> J. Ni, Z.Q. Liu and P. Wang	26
<b>Database Design of Roadside Parking Toll Collection System</b> F.Q. Yu and J.H. Guo	30
<b>Estimation on LTO Cycle Emissions from Aircrafts at Civil Airports</b> Q. Zhang, H.S. Xu, Y. Wu, S.L. Sun, D.B. Yan and T. Gui	34
<b>Investigation of Cold Start Engine Performance at Low Temperature Fuelled with Alternative Fuel</b> G.X. Gao, Z.L. Yuan and J.D. Yu	39
<b>Investigation on Reaction Flow Field of Low Emission TAPS Combustors</b> Q. Zhang, H.S. Xu, T. Gui, S.L. Sun, Y. Wu and D.B. Yan	45
<b>Modeling and Simulation of Two-Stage Expansion Air-Powered Engine</b> Q.P. Zheng, J. Wang, S. Li, J.J. Zhou and F. Bai	49
<b>Simulation of HCCI Combustion Characteristics for Low RON Gasoline Surrogate Fuels</b> L.Z. Zhang, Y.K. Sun, S. Li and Q.P. Zheng	54
<b>Research on Vessel Trajectory Multi-Dimensional Compression Algorithm Based on Douglas-Peucker Theory</b> F.X. Zhu, L.M. Miao and W. Liu	59
<b>Study on the Low Carbonization of Highway Electromechanical System</b> L. Gao	63
<b>The SOC Estimation for Power Battery Using KF Method which Parameters are Updated by Least Square Method</b> Y.Z. Pang, X.Y. Zhang and J.T. Tian	67
<b>The Application of Fluid Analogy Method for Estimating Transit Route ODs Using IC Card On-Off Passenger Data</b> X.H. Hu and Y. Zhang	73
<b>The Analysis of Urban Road Traffic State Based on Kinds Floating Car Data</b> X.T. Yin, C.Q. Ma and L.P. Qu	80
<b>Synthesis and Property of a Green Melting-Snow Additive for Asphalt Pavement</b> C. Peng, J.Y. Yu, J. Dai, Z.J. Zhao, J.Y. Fu, M.L. Zhao and W. Wang	85
<b>Slotting Optimization Model and Algorithm for Concerning the Correlation in Hybrid Travel Policy</b> X.M. Zhou, Y.D. Li and Y.P. Yao	90
<b>Restoration Strategies of Urban Road Network after Earthquake Based on Corrected Component Probabilistic Importance</b> J.L. Yuan, Y.D. Yan, D. Huang and C. Du	95
<b>Research on the Traffic Safety on the Section of Expressway with Crosswind in Mountainous Area</b> Z.Y. Zhang, G.L. Qian, Q. Wang and L. Wu	102
<b>Numerical Study on the Running Safety of High-Speed Train under the Cross Wind</b> X.D. Chen and Y.G. Xu	109

<b>Bus Safety Regulatory System Design Based on Internet of Vehicles Technology</b> L.S. Xie, X.Y. Chen and Y.Z. Lin	114
<b>Road Performance of Warm-Mix Modified Bitumen Mixture with EC120</b> J. Xiao, Z.F. Mo, H.X. Lu and X.Y. Tang	118
<b>Effect of Warm Mix Additive EC120 on Asphalt Performance</b> X.Y. Tang, J.X. Deng, H.B. Zhang and J. Xiao	123

## **Chapter 2: Renewable Energy, Clean Energy Technologies and Fuel Cell**

<b>XPS Analysis Pyrolytic Char of Cellulose with Different Crystallinity Based on Ionic Liquid Regeneration</b> B. Zhang, P. Wang, Z.G. Chen, X. Gong and M.H. Xu	129
<b>Experimental Study on Biomass Char Combustion in O<sub>2</sub>/CO<sub>2</sub> Atmosphere</b> J.H. Lian, Z.F. Wang, W. Ji, G. Yang, L.S. Liu, J.X. Wu, E.Y. Wang and X. Gou	136
<b>An Analysis on the Model of Wind Power Generation Cost per Kilowatt-Hour in China</b> J. Shen, L.J. Yan and Y. Li	142
<b>Optimal Construction Program of Wind Power Farm on the Beach</b> H. Zou	146
<b>The Wind Power Forecast Model Based on Improved EMD and SVM</b> G.C. Chen, X. Zhang and Z.W. Guan	150
<b>Experimental Study on Parabolic Trough Solar Heating System</b> B. Yang, W. Wang and L. Wang	155
<b>Power Flow Calculation for Distribution System Including PV Type Distributed Generation</b> F. Han, N. Zhou, J.W. Ma and X.L. Yu	159
<b>Research on the Impact of Shadow on the Performance of Building Photovoltaic System</b> L. Guo, Y. Liang, X. Zhang and X.T. Yang	163
<b>Simulation Design and Benefit Analysis of Grid-Connected Photovoltaic System</b> C. Wang, Y. Liu, X. Zhang and X.T. Yang	169
<b>Research of Current-Sharing Control Strategy of Parallel PEMFC DC Power Supply System</b> L. Xu, Y. Xu, J.Q. Wang, J.H. Fang and S. Luo	173

## **Chapter 3: Thermal Engineering, Kinetics, Heat Pump and Energy-Saving Technologies**

<b>Influence of Jet Angle on Diffusion Flames in Centrifugal Field</b> E.Y. Wang, J. Qin, X. Xiang and J.X. Wu	181
<b>Numerical Study on Supersonic Combustor with an Allotype Cavity</b> J.X. Wu, J. Sun, X. Gou and L.S. Liu	187
<b>Control of Ice Crystal Growth by Different Surfactants in Ice Slurries</b> X.Z. Zhao, J. Zhao, M.H. Ge, Q.S. An, F.B. Wang and L.H. Gao	193
<b>Numerical Simulation Research on the Internal Flow of a Heat Exchanger</b> Z.F. Wang, Y.B. Yin, W. Ji, Y. Meng, L.S. Liu, J.X. Wu, E.Y. Wang and X. Gou	200
<b>The Effects of Arrangement of Longitudinal Vortex Generators on the Flow and Heat Transfer in the Rectangular Channel</b> N. Cai, L.T. Tian, C.H. Min and C.Y. Qi	205
<b>Energy-Saving Analysis and Heat Transfer Performance of Wastewater Source Heat Pump</b> Y.X. Gu, T. Wang, W. Liu and F.F. Ma	211
<b>Experimental Study on Effect of CO<sub>2</sub> Heat Pump Evaporator on Frosting Condition</b> S.Q. Zhu, J. Lv, H.X. Lu, D.D. Shi and F. Xu	218
<b>Heat Imbalance Analysis of a Hybrid Ground-Source Heat Pump System</b> E.Y. Wang, Y. Lu, X.F. Kong and C.Y. Qi	222
<b>Study on the Feasibility and Environmental Benefits of South Hot Spring Wastewater Source Heat Pump Technology</b> H.W. Xing, L. Lai, J.H. Chen, K.R. Qin and W.D. Xu	227

<b>Analysis for Cascade Recycling of LNG Cold Energy</b> H.J. Xu, X. Luo, Q.J. Mao, L. Gong and S.B. Huang	231
<b>Experimental Analysis of the Coefficient of Building Comprehensive Property</b> Z. Han, C.H. Sun, C.Y. Qi, G.Q. Xia and B. Shao	237
<b>Experimental Research on Energy-Saving Application of Permanent Magnet Speed Regulation Technology</b> J.H. Zhu	242
<b>Hydraulic Condition Analysis of Different Position Heat Exchange Stations in Heat Supply Network</b> K.R. Chi, W. Ji, H. Yang and G.Q. Xia	247
<b>Laboratory Research on Vitrified Microsphere Insulation Mortar</b> J.Q. Gong, S.L. Liu, X. Hu and K.Q. Sun	251
<b>Numerical Simulation of Indoor Thermal Environment of a Double-Skin Facade Office with Different Shutter Angles</b> X. Zhan, H. Yang and F.Y. Jin	256
<b>Numerical Simulation Research on the Heating Process of Air by Waste Heat</b> Z.F. Wang, J.L. Liu, L.S. Liu, Y.B. Yin, J.X. Wu, E.Y. Wang and X. Gou	260
<b>Risk Assessment and Control Measures of Air Conditioning System in Large Commercial Building</b> W.K. Dang, G.Q. Xia, Y.L. Zhong, L. Yang, C.H. Sun and H. Yang	266
<b>The Experimental Analysis on the Regularity of Heating Load in Buildings Using Heat Meters with On-Off Time and Area Method in Shijiazhuang Area</b> C. Wang, C.H. Sun, C.Y. Qi, F.Y. Jin and B. Shao	272

## **Chapter 4: Mechanical and Fluid Engineering**

<b>Static Finite Element Analysis on Cast Shell of a 100 kW Single Screw Expander</b> Q. Liu, H. Guo, W. Wang, Y.T. Wu, F. Ye and C.F. Ma	279
<b>The Inverse Kinematics and Simulation of a Novel 3-DOF Parallel Mechanism</b> X.L. Dai, Y. Chen and L. Zhang	283
<b>Effect of Velocity Profile on the Stability of Liquid Sheet</b> R.Z. Duan, Z.Y. Chen and L.J. Yang	288
<b>Experimental Study and Mechanism Analysis of Effervescent Atomization</b> C. Du, L.S. Liu and J.G. Fan	292
<b>Study on Flow of Ionic Liquids under Electromagnetic Drive</b> J. Wan, J.Q. Yang, Z.W. Ying, Y.T. Shen, Y. Zuo and Z.C. Liang	301

## **Chapter 5: Mining, Oil, Gas and Petrochemical Engineering**

<b>Enhancing the Safety of Coal Mining by Injecting CO<sub>2</sub> into Coalbeds</b> F. Mo, X.L. Peng and Z.M. Du	307
<b>Geophysical Model of Coal Prospecting in Uplift Area</b> G. Li, L. Zhang, Y. Fu and Y.B. Zhou	312
<b>Study on the New Combined Technology of Tungsten Dressing and Metallurgy and its Economic Feasibility Analysis</b> H.L. Zhu, H.B. Deng and C. Chen	321
<b>The Fushun Oil Shale Semi-Coke's Combustion Features and Thermal Dynamic Analysis</b> Y.C. Li and Y.M. Yang	327
<b>Study on Silicon Scale-Forming in ASP Flooding System</b> S.D. Jiang, Y.K. Liu, M. Fan, R.Y. Chen and Y. Lu	332
<b>Organic Solvent Extraction and Modified Aluminum Retort Experiments of an Indonesian Oil Sand</b> F. Nie, D.M. He, J. Guan, K.S. Zhang and Q.M. Zhang	336
<b>Injection Method of SJT-B Collosol in the Low Permeability Reservoir</b> K.L. Wang, J.Y. Li, L.L. Zhang, X. Li, G.Q. Fu and W.L. Li	340

<b>The Detailed Calculation Model of the Friction between Sucker Rod and the Liquid in the Sucker Rod Pump Lifting System of Heavy Oil</b> Z. Ma, S.L. Peng, Z.Z. Qu and J. Li	346
<b>The Research and Application of Segregated Completion Technology in Horizontal Wells in the Heavy Oil Reservoirs</b> Z.Y. Sun and J.C. Zhao	350
<b>The Screening of Oil Resistant Foaming Agents and Oil Displacement Effect Evaluation of Foam Flooding</b> K.L. Wang, X. Li, S.J. Sun, J.Y. Li, Y. Yuan and B.L. Zhou	354
<b>Numerical Simulation Study on Feasibility of Coal-Bed Methane Reservoir Commingling in Qinduan Block</b> Y.K. Liu, Y. Yan, J.M. Wang, L.H. Xia, T. Li and W.H. Zhao	359

## **Chapter 6: Environmental Engineering and Wastewater Treatment Technologies**

<b>Garlic Peel as Adsorbent for the Removal of Methylene Blue from Aqueous Solution</b> C.Y. Ma, Z. Li, W.H. Zhao, Y. Xu, G.R. Cui, Y.F. Xiu and K. Huang	367
<b>Influence of Flow Field on Simultaneous Removal of Nitrogen and Carbon by Membrane Aerated Biofilm Reactor</b> N. Zhang, Y. Wu, H.W. Zhang and H. Jia	372
<b>Removal of Chloroform in Water by Three-Phase Materials: Fe<sup>0</sup>/TiO<sub>2</sub>-EP/ AC</b> C. Liu, Q. Shao and L.J. Geng	377
<b>Removal of Mn(II) from Aqueous Solution Using Saponified Garlic Peel</b> B. Liang, W.H. Zhao, K. Huang and H.M. Zhu	382
<b>Study about Numerical Simulation of Subsurface Flow Constructed Wetlands Based on Hydrus-CWM1</b> N.Y. You, W.P. Guo, B. Xiong and X.Q. Lu	387
<b>Study on Preparation and Properties of Microbial Flocculant/Sepiolite Fibers Water Treatment Materials</b> Z.H. Guo, J.L. Feng, L. Zhang, H. Zhu, S.X. Zhang and J. Guo	391
<b>An Engineering Practice of Industrial Wastewater Treatment with Fe/Cu Bimetallic Process</b> X. Liu, H.W. Wang, J.H. Fan, L.M. Ma and J. Xu	396
<b>Efficiency Optimization of Organic Pollutant Removal in Pharmaceutical Wastewater by Microwave-Assisted Fenton-Like Technology</b> X.D. Qi and Z.H. Li	406
<b>Study of Dynamic Adsorption of Trace Kr and Xe by the <sup>129</sup>Xe and <sup>84</sup>Kr Tracing Method</b> Y.L. Wang	411
<b>Studies on the Environmental Impact of the HVAC Equipments Based on the LCA Theory</b> Y. Ren and Y. Zhao	417
<b>Study on the Safety Precautionary Measures of Welding in Ship Repairing and Building</b> K.L. Xu	422
<b>Green Consumption: An Environmental Friendly and Healthy Approach for Chinese Consumers</b> L.J. Zhou	426
<b>Establishment and Application Research of Evaluation System for Low-Carbon Industrial Park - Case Study on Caoheidian Industrial Park in Hebei Province of China</b> C. Huang, Y.S. Sun and M.H. Li	430
<b>The Research of Landslide Monitoring Data Integration Framework Based on Three-Dimensional WebGIS</b> J.Q. Zhang, C.L. Wu and J.Q. Fan	436
<b>Study on Photoelectric Catalysis Reduction of CO<sub>2</sub> on a WO<sub>3</sub> Modified Cu<sub>2</sub>O Composite Electrode</b> N.F. Tang and Y.P. Liang	442
<b>Research on Formability of Size Foaming in Biomass Buffer Composites</b> X.H. An, P. Liu, Q. Meng, C.G. Su and S. Zhao	446
<b>Enhanced Soil Washing of PCB by Sophorolipids from Transformer Oil Contaminated Soil</b> X.Y. Qi, X. Song and Y.M. Sun	450

<b>Characteristics and Origin of Loess Landslides on Loess Terraces at Heifangtai, Gansu Province, China</b>	
W.J. Wu, X. Su and X.M. Meng	455
<b>Poly(vinylidene fluoride) (PVDF) Membrane Preparation with an Ionic Liquid via Thermally Induced Phase Separation Melt Technology</b>	
Z. Liu, D.B. Sun, W.Y. Dong, S.H. Feng, C.F. Xiao, Y.F. Zhang and J.F. Wei	462

## **Chapter 7: Environmental Pollution Control Technologies**

<b>Numerical Simulation on South American Coal Reburning in a Pulverized Coal Combustor</b>	
Z.F. Wang, J.L. Liu, L.S. Liu, B. Xia, J.X. Wu, E.Y. Wang and X. Gou	469
<b>A Study on Flame Structures in CH<sub>4</sub> Counterflow Partially Premixed Flame</b>	
J. Luo, L.S. Liu and Z.Z. Chen	474
<b>Experimental Research on Catalysts of V<sub>2</sub>O<sub>5</sub>/AC and V<sub>2</sub>O<sub>5</sub>/CNTs for Low Temperature SCR Denitrification</b>	
J. Liu, K. Zhang, M. Si, J.H. Lian, L.S. Liu and X. Gou	478
<b>Comparison of De-NO<sub>x</sub> Performance of Mn/AC and Mn/Bio-Char on Low-Temperature SCR</b>	
M. Si, Z.F. Wang, W. Ji, G. Yang, L.S. Liu, J.X. Wu, E.Y. Wang and X. Gou	484
<b>Effects of Biomass and Crude Oil Co-Combustion on NO and SO<sub>2</sub> Emissions</b>	
G. Yang, Z.F. Wang, M. Si, J.H. Lian, L.S. Liu, J.X. Wu, E.Y. Wang and X. Gou	489
<b>Combustion Experimental Study of Reed Black Liquor (RBL) Droplets and Particles in Fluidized Bed</b>	
X.F. Song, R.S. Bie, Q.Q. Liu, X.Y. Ji, P. Chen, Y. Zhang and J. Fan	494
<b>Thermodynamic Investigation on SO<sub>3</sub> Distribution in Oxy-Fuel Combustion</b>	
H.P. Xiao, G.Y. Han, L. Dong and X. Ning	498
<b>Studies on Scroll Compressor Noise Improvement</b>	
Q. Miao, Y.R. Men, J.X. Wu and X. Gou	504
<b>A Study on Estimating Gasoline Engine Radiated Noise Based on Surface Vibration Measurement</b>	
G.X. Cui, C.S. Gu and H. Gao	509
<b>Simulation Research about Impacts of Flue Gas on Surrounding Buildings</b>	
Z.F. Wang, B. Xia, T. Xue, L.S. Liu, J.X. Wu, E.Y. Wang and X. Gou	514

## **Chapter 8: Demand and Consumption of Energy and Resources in Context of Sustainable Development**

<b>An Analysis of the Factors Influencing Energy Demand in China Based on Cointegration Theory</b>	
X.W. Yang	523
<b>Analysis of Energy Consumption Carbon Emissions in Hunan Province Based on Industrial Structure</b>	
J.G. Yue, Y.J. Yu and L. Wu	528
<b>Analysis of Water Sustainable Utilization in Changsha City Based on Water Footprint Theory</b>	
L. Wu	532
<b>Energy Analysis and Sunshade Strategy Research of Passive Public Buildings</b>	
W.M. Qiang, S.J. Fu and Y. Jin	536
<b>Study of the Relationship among Economic Growth, Export and Energy Consumption in China</b>	
X.W. Yang	542

## **Chapter 9: Agricultural Technologies in the Context of Sustainable Development**

<b>Multi-Criteria Optimization in Forest Exploitation</b>	
Y.V. Lebedev, V.P. Anufriev and V.V. Belov	549

<b>Study on Nutrient Characteristics Analysis of Back Soil Area</b> Y.L. Zhao, L. Ma, L.Y. Cao and G.F. Chen	554
<b>Calculation and Analysis of Contribution Rate from Technology Advancement about Flue-Cured Tobacco Production in Guizhou Province</b> D.B. Huang and L. Lin	558
<b>Diversity Status and Conservation Countermeasures of Medicinal Fungus Resource in China</b> B. Yang, Y.X. Liu, Y.Q. Mu, Z.Y. Liu and D.Q. Zhou	563
<b>Nutrient Limiting Factors in Red-Yellow Soil from Different Parent Rocks at Oil-Tea Forest Land in the South-Central Region of China</b> Z.Y. Cui, X.M. Deng, R.C. Xi, R.P. Li and J.X. Hu	568
<b>Orthogonal Analysis Methodology for the Extraction of Polysaccharides from the Root of <i>Rhodiola sachalinensis</i> A. BOR and Evaluation its Hypoglycemic Effects</b> Y. Liang, F.L. Li, C.J. Zhang and H. Yu	576
<b>The Nutrients Spatial Variability of Black Soil Based on GIS</b> Y.L. Zhao, H.Y. Han, L.Y. Cao and G.F. Chen	580