



PROCEEDINGS OF THE 3RD INTERNATIONAL SYMPOSIUM ON HEAT TRANSFER AND ENERGY CONSERVATION

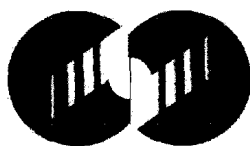
Volume 1

Editors in Chief

Hua Ben , Guo Zengyuan and Ma Chongfang



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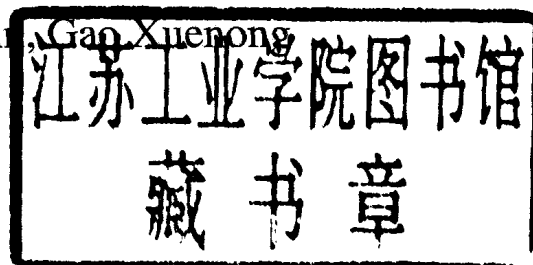
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Zhu Dongsheng, Chen Qingli, Gao Xuenong



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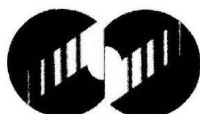
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PREFACE

It is an honor to participate in this important conference as one of the Honorary Conference Chairman. Indeed, it is a great personal pleasure to see so many friends of long standing among the Chinese and worldwide attendees. This year is the 20th anniversary of my first visit to China. In spite of the dramatic growth of electronic communications, I feel that the most significant advances in technology will be realized by personal contact. This conference provides the direct communication of technical information, and the opportunity to formally and informally learn more about the material presented. Cyber-conferences will never replace real symposia, such as this one.

I was privileged to attend the first International Symposium on Heat Transfer Enhancement and Energy Conservation in 1988, also held in Guangzhou. At that time, I talked about the impact of enhanced heat transfer on energy conservation. It is clear that energy conversion and utilization systems depend on temperature gradients. By reducing these gradients or making them more effective, through enhancement of the heat transfer coefficient in heat exchangers, there will be better use of energy resources. While it is necessary for the entire world to “conserve energy”, it is particularly important for China to do so.

An increase in the Chinese standard of living will require an increase in the per-capita use of energy. Given China's large, and expanding, population, a sharp change in the national energy budget is expected. This may not be possible from the standpoints of geopolitical factors and environmental protection. The demand in energy is present in all sectors – industrial, residential, and transportation. The primary fuels of choice are oil and natural gas, but there is a widening gap between domestic supply and needs. It is predicted that over 8 million barrels of oil a day will be imported by China in 2015, up from about 2 million barrels a day at the present time. It is no surprise that Chinese energy companies have been seeking supplies outside the volatile Persian Gulf, for reasons of natural security. Oil especially affects the transportation sector. The number of cars on China roads increased over 50% in 2002, to 20.5 million vehicles. Even after the rapid growth tapers off, the number of cars is expected to grow by 10% per year, from 2005 – 2010. Considering that a modern automobile has as many as 7 heat exchangers, the opportunities for energy conservation through enhanced heat transfer are evident. The improvement of industrial and residential heat exchangers is also a major opportunity. But the rapidly escalating use of energy in China has led to an increase in pollution. For instance, China's booming auto market is not only consuming gasoline at an alarming rate, but also emitting pollutants that contribute to China's deteriorating environment. A prosperous and healthy China will require greater efficiency of energy utilization, so that there is a reduced rate of growth of energy consumption. Coincident with that, the pollution from cars, power plants, etc. must be reduced. Advanced combustion engines offer the prospect of greater fuel economy and reduced emissions. Diesels are also possibility, as they are more efficient than gasoline-engine cars of comparable output. It is argued that they are just as clean, if not cleaner, than spark-ignition engines. Turning to power plants, local coal now provides 60% of electricity output, but natural gas is being pushed hard as a cleaner fuel. This provides new options for heat recovery in boilers.

In my view, China has a unique opportunity, as well as a mandate, to employ the latest conservation technologies as energy use escalates. This will reduce the energy resources that are needed and reduce pollution. Included in the mix of energy resources are renewable, such as wind and solar. It is expected that this symposium will provide the technologies and discussions that will lead to a secure energy future for China.

Arthur E. Bergles
Honorary Chairman, ISHTEE
Honorary Professor, Beijing University of Technology

Contents

Section 1 Enhancing Heat Transfer in Processes

Gas Flow Analysis in Microchannels with Bends Using Direct Simulation Monte Carlo Method.....	3
Wang Moran, Wang Jinku, Li Zhixin	
Enhancing Heat Transfer in Separated Flow Behind A Rib or A Backstep at High Level of Free-Stream Turbulence.....	10
Victor.I. Terekhov, Nadezhda I. Yarygina, Rustam F. Zhdanov	
Investigation on Hypersonic Heat-Transfer Reduction Using An Upstream-Directed Jet.....	18
Geng Xiangren, Gui Yewei, He Lixin, Wang Anlin	
Temperature Field Analysis and Calculation of Buried Gas Pipelines.....	22
Wu Yuguo, Chen Baodong	
Numerical Study of Laminar Heat Transfer in Pipe Under Supercritical Pressure.....	28
Xu Feng, Guo Liejin, Bai Bofeng, Mao Yufei, Duan Jianzhong, Chen Xuejun	
Field Coordination Analysis on Flow Past A Circular Cylinder at Low Reynolds Number.....	34
Ke Wenzhu, Song Yaozu	
The Effect of Blowing Ratio on Effusion Cooling Effectiveness.....	39
Hu Yaping, Ji Honghu	
Field Coordination Analysis of Convection Heat Transfer in Rectangular Ducts with Different Thermal Boundary Conditions.....	45
Wang Junrong, Min Jingchun, Song Yaozu	
Heat Transfer of Pulsating Flow in Parallel Plate Channel with Constant Heat Flux.....	52
Yu Jiecheng, Li Zhixin	
A Multi-Layer Information Integration Platform For Process Operation System.....	59
Li Hehua, Qian Yu, Li Xiuxi	
Experimental Investigations and Theoretical Studies on Rijke Tube.....	65
Zhu Yongbo, Jiang Genshan, Zhu Zhengxiang	
An Empirical Correlation for EHD Enhanced Natural Convection Heat Transfer Along A Plate Surface.....	68
Wang Fagang, Li Ruiyang, Yu Hongling, Liu Yongqi, Lin Zonghu	
The Study of the Enhancement of Heat Transfer Due to Buoyancy Under The Condition of Mixed Convection in a Vertical Annular Passage.....	73
Wu Tianhua, Xu Zeyuan, J.D. Jackson	
A Study of Coupled Convective Heat and Mass Transfer From Thin Water Film to Moist Air Flow.....	82
Yuan Zhongxian, Ma Chongfang	
Steady Numerical Simulation of Pool Nucleate Boiling Heat Transfer.....	88
Wang Anliang, Yang Chunxin, Wu Yuting, Yuan Xiugan	
A New Approach for Condensation Heat Transfer Enhancement.....	95
Ma Xuehu, Chen Xiaofeng, Bai Tao, Chen Jiabin	
Stratified Flow Model of Evaporation Heat Transfer in Horizontal Microfin Tubes.....	101
Hiroschi Honda, Wang Yueshe	

Flow and Heat Transfer Characteristics of a Natural Circulation Liquid Cooling System for Electronic Components.....	109
Hiroshi Honda, Zhang Zhengguo, Nobuo Takata	
A Microscopic Observation of Transient Frost Formation Processes and Their Analysis by Use of Phase Change Dynamics.....	117
Wang Hongyan, Liu Zhongliang, Ma Chongfang	
Experimental investigation of Flow Boiling Heat Transfer in Vertical Narrow Annular Channels.....	123
Su Shunyu, Huang Suyi, Wang Xiaomo	
Heat Transfer in Wiped Thin-Film Evaporator With Inner Condenser.....	129
Pi Pihui Wen Xiufang, Cheng Jiang, Yang Zhuoru	
A Microscopic Study of Explosive Boiling Induced by Pulsed-Laser Irradiation.....	135
Huai Xiulan, Zhao Tianshou, Dong Zhaoyi, Liu Dingying	
Experimental investigation of Heat Transfer Capability of Falling Film Evaporation in The Vertical Tube with Spring Inserts.....	141
Tao Jinliang, Qiao Liang, Shi Xiaoping	
Effect of Temperature on Moisture Transport in Unsaturated Porous Media Under Natural Condition...	147
Liu Bingcheng, Liu Wei	
Heat Transfer at Boiling in Thin Film Liquids.....	154
V.N.Slesarenko	
Research One High Efficient and Saving-Energy Evaporators With Fouling Prevention and Natural Cycle of Low Flowing Velocity.....	162
Jiang Shaoqing, Yu Tianlan, Yu Xiumin, Liu Guiying, Ning Liwei, Peng Deqi, Cui Xiaoli	
Effects of Surface Wettability on Behavior of Frost Growth on Surfaces During its Early Growth Period.....	167
Wu Xiaomin, Xu Wangfa, Wang Weicheng, Tang Limin	
Condensation Heat Transfer and Pressure Drop of R22 in 5 mm Micro-Fin/Smooth Tubes.....	174
Wu Xiaomin, Wang Xiaoliang, Wang Weicheng	
Reducing The Condensing Temperature to Improve The Efficiency of Air-Cooled Chillers.....	180
Fu Wingyu, Kwok TaiChan	
Experimental Study on Flow Heat Transfer in the Vertical Narrow Annuli.....	186
Peng Changhong, U AyeMyint, Guo Yun, Jia Dounan, Qiu Suizheng, Su Guanghui, Nie Changhua	
Thermodynamic Analysis Optimal Parameters in Auxiliary Boyler Process.....	194
V.N.Slesarenko, A.A.Panasenko	
Heat Transfer Enhancement at Boiling Crisis in Stright and Spiral Tubes.....	200
Kuzma Kichta Yu.A, Komendantov A. S, Bolshakov R. N, Yang Yanhua, Kuang B	
Ehd Boiling Heat Transfer Enhancement Outside Horizontal Tubes.....	205
Yu Hongling, Li Ruiyang, Huang Xuan, Chen Zhihang	
EHD(Electrohydrodynamic)Enhancement of Boiling Heat Transfer with R11 in Plate Surface.....	211
Huang Xuan, Li Ruiyang, Yu Hongling	
EHD Enhancement of Boiling Heat Transfer in-Tube by Using an Eccentric Electrode: Eletrode Polarity.....	216

Liu Yongqi, Li Ruiyang, Yu Hongling, Wang Fagang	
Transient Boiling Critical Heat Flux in a Pool of Freon-113 and Ethanol Under Saturated Conditions...	221
Katsuya Fukuda, Liu Qiusheng, Jong Doc Park	
Large-Scale Molecular Dynamics Simulation of Bubble Nucleation.....	228
Wang Jinzhao, Chen Min, Wang Bing, Shu Jiwu, Guo Zengyuan	
High-Energy Pulsations in Burnout and Critical Flow of Boiling-Up Liquid.....	235
Alexander V. Reshetnikov, Viacheslav N. Skokov, Vladimir P. Koverda	
An Experimental Study for the Enhanced Condensation Rate of R-134a Vapor on Single Horizontal Integral-Fin Tubes.....	241
Ravi Kumar, K. N. Agrawal, Bikash Mohanty, H. K. Varma	
Promotion of High-Flux Processes Through Enhanced Heat Transfer.....	247
Arthur E. Bergles	
Experimental Research on Pool Boiling Heat Transfer in Horizontal Narrow Spaces.....	264
Long Enshen, Xin Mingdao	
A Study on the Characteristics of Liquid-Vapor Interface by Using Fractal Theory.....	269
Wang Deming, Zeng Danling, Cai Zhiyong, Liu Juanfang	
The Constant Parameter Output of Heat Exchangers During their Dynamic Process.....	274
Li Kequn, Luo Xing, B. Niemeyer, Li Meiling	
Two Phase Flow Patterns and Heat Transfer of Flow Boiling in a 3-Dimensional Micro-Finned Helix Tube.....	281
Cui Wenzhi, Xin Mingdao	
The Effect of Radiation Scattering on Dynamics of Transitional Zone on Solidification of a Semitransparent Material.....	287
N.A. Rubtsov, N.A. Savvinova	
The Influences of Physical Properties of Two-Phase Mixture on Void Fraction in an Annular Vessel.....	294
Li Xiaoming, Bi Qincheng, Feng Quanke, Chen Tingkuan, Du Shejiao	
Study on the Influences of Turbulent Characteristic Parameters on Premixed Combustion in a Constant Volume Bomb.....	300
Li Su, Zhang Xu, Su Qin, Zhang Tiechen	
Gas-Particle Heat Transfer Enhancement by Centrifugal Force Field.....	307
Shi Mingheng, Wang Hai	
Numerical Simulation of the Behavior of a Dielectric Sphere Under Electric Fields.....	312
Dong Wei, Li Ruiyang, Yu Hongling	
Thermo-Fluid Analysis of Two-Phase Flow with Phase-Change Against Intense Heat in Porous Media...	319
Jun Abei, Kazuhisa Yuki, Hidetoshi Hashizume, Saburo Toda	
Observational Studies on Axial Hydrodynamic in Vapor-Liquid-Solid Boiling Flow with CCD Measurement.....	328
Liu Mingyan, Tang Xuanping, Jiang Feng	
Experimental Study on Falling Film Absorption with Aqueous LiBr Solution on Two-Scale Corrugation Plate Surface.....	335
Chen Yaping, Li Yingbin, Shi Mingheng	

Thermal and Hydraulic Design of a New-Type Air-Cooler in a Turbo-Charger System of Internal-Combustion Engine.....	340
He Yaling, Gao Jian, Tang Lianwei, Tao Wenquan	
Research on Temperature Distribution of Steel-Concrete Composite Beam Specimen.....	346
Chen Huanxin, Liu Weiwei, Guo Zengyuan	
Analysis the Effect of Moisture on the internal Thermal Conductivity of Biomass.....	353
Wang Hairong, Ma Xiaoqian	
Study of Effect of Channel Size on Performance of Direct Methanol Fuel Cells.....	359
Guo Hang, Ma Chongfang, Wang Maohai, Ye Fang, Wang Chaoyang	
Co-Combustion Suitability of Mediterranean Fuels for Co-Firing Coal and Biomass Blends in Premixed Burners.....	364
J. Velilla, A. Gil, C. Cortés, S. Espatolero, M. Berdusán	
Research on Natural Gas in a Catalytic Combustion Burner.....	370
Zhang Shihong, Zhou Qi, Qiu Lin, Wang Wenhai	
Volatility of Trace Elements and Characterization of Ash at Different Coal Combustion Temperatures.....	375
Liu Guijian, Zhang Haoyuan, Yang Pingyue, Peng Zicheng	
Study on Thermal Properties of Phase Change Cool Storage Composite Materials.....	381
Fang Guiyin, Li Hui .	
Thermal Performance of a Heat Receiver Using Multiple Phase Change Materials.....	387
Cui Haiting, Yuan Xiugan	
An Experimental Study on the Characteristics of Solidification of Stearic Acid in an Annulus with and without Fins	393
Sun Xuan, Liu Zhongliang, Ma Chongfang	
A Model for Design of a Melting-Freezing Rotating Heat Exchanger.....	400
Lin Sui, Chen Tzu-Fang, Zheng Jaing	
The Simulative Research on Operation Conditions of the Solar Ground-Coupled Heat Pump System....	408
Yu Yanshun, Ma Zuiliang, Lian Leming	
Numerical Analysis of Convective Thermal Diodes in Composite Solar Wall Collector.....	416
Chen Wei, Liu Wei	
The Impact of Ejector Characteristics on the Operation and Performance of a Conventional Refrigeration Cycle.....	422
Zine Aidoun, Mohamed Ouzzane	
Influence of Boron Doping on the Conductivity of Amorphous Silicon Film and on the Photovoltaic Efficiency of Solar Cell.....	430
Lin Lie, Cai Hongkun, Zhang Dexian, Hao Yanming, Sun Yun	
The Performance of Materials on Polyimide Film Substrates and the Influence on the Photovoltaic Efficiency of Solar Cells.....	433
Cai Hongkun, Lin Lie, Zhang Dexian, Sun Yun, Hao Yanming	
Study of Heating and Cooling Experiment with Solar Energy in Severe Cold Area.....	439
Zheng Maoyu, Zhi Yansheng	

Temperature Matching Between Binary Non-Azeotropic Mixtures and Secondary Heat Transfer Fluids in Heat Pumps.....	445
Zhao P.C., Zhao L., Ding G.L.	
Theoretical Analysis of Indirect Evaporative Cooler with Separate Type Heat Pipe Applied on Ventilation.....	456
Yu Xia, Wang Wen, Wang Ruzhu, Chen Benlin, Cai Yonghong, Lu Jianfei	
Analysis of the Thermal and Power Characteristics of Solar Cell in Concentration.....	462
Wu Yuting, Zhu Hongye, Ren Jianxun, Liang Xingang	
Determination of the Vertical Well Depth of A Ground Source Heat Pump System.....	467
Fan Aiwu, Liu Wei	
Exergy Analysis on a Cascade Heat Pump System in Application to Freeze-Dryer.....	472
Liu Yongzhong, Chen Shuhui, Shen Renjie, Feng Xiao	
Study on Refrigeration and Heating Hybrid System Based on Cascade Utilization of Solar Energy.....	478
Luo H. L., Wang R. Z.	
Analysis of Operating Performance Under Various Loads for Centrifugal Compressed High Power Heat Pumps.....	483
Xiang Xinyao, Zhang Yonggui, Cheng Qinglin	
Heat and Mass Transfer in a Tubular Solar-Powered Solid Adsorption Ice-Maker.....	489
Long Xinfeng, Liang Ping, Eric Hu Jin	
Improvment on the Performance of Double Absorption Heat Transformer by Adopting a New Solution Cycle and Two Solution Heat Exchangers.....	497
Zhao Zongchang, Zhang Xiaodong, Ma Xuehu	
Simulation of the Performance of Double Absorption Heat Transformer with New Solution Cycle and TFE/E181 Working Fluids.....	503
Zhao Zongchang, Zhang Xiaodong, Chen Jiabin	
Study For the Performance of a Solar-Ground Source Heat Pump System with Vertical Double Spiral Coil Ground Heat Exchanger.....	508
Bi Yuehong, Guo Tingwei, Zhang Liang, Chen Lingen	
The Maximum COP and the Maximum Cooling Load of an Irreversible Four-Heat-Reservoir Absorption Refrigerator.....	516
Chen Lingen, Zheng Tong, Sun Fengrui	
Heat Storage Performance of Phase Change Materials(PCMS) of the Saturated Unitary Alcohol.....	523
Fu Jianghui, Xu Bu, Wu Xianghong, Zheng Danxing	
A New Type of Hybrid Chemical and Physical Adsorption Energy Storage System.....	529
Li Jun, Zhu Dongsheng	
Trial Study of Small-Sized Solar LiBr Chiller.....	533
Lian Yongwang, Li Jianhong, Zhu Dongsheng	
Experimental Investigation of Charging Performance for Ice Storage with Nucleation Agents in Rectangular Capsules.....	538
Fang Guiyin, Li Hui	
The Experimental Study of GSHP System's Working Characters in Winter.....	543

Wei Jiaxiang, Tang Zhiwei, Ma Chongfang	
Restorative Characteristics of Ground Temperature in the Intermittent Process about the Behavior of Earth Energy in Ground Source Heat Pump.....	547
Gao Qi, Li Ming, Yu Ming, Qiao Guang	
Experiment Investigation about Enhanced Heat Transfer of Underground Heat Exchanger in Ground Source Heat Pump.....	553
Gao Qing, Yu Ming, Li Ming, Qiao Guang, Fang Ying	
The Melting and Solidification Process of the Heat Storage Medium by Phase Change in the Spherical Ball.....	559
Shen Weidong, Zeng Danling	

Section 2 Enhancing Heat Transfer Techniques

Study of Enhancing Heat Transfer for Spiral Finned Tube Economizer.....	567
Hu Wensen, Li Bin, Cao Zidong, Chen Tingkuan	
Experimental Investigation on Heat Transfer and Flow Resistance Performance of Rodbaffle Multi-Tube Type of Double-Tube Heat Exchanger.....	572
Wang Xuesheng, Wang Ruzhu	
Experimental Studies on Performance of Three Rotary Dehumidifiers Fabricated with Corrugated Honey-Comb Paper Coated with Different Desiccant Materials.....	578
Dai Y.J., Zhang X.J., Zhong J.H., Wang R.Z.	
Experimental Investigation on the Flow Characteristics over Riblets.....	584
Gong Wuqi, Xu Zhong, Huang Shujuan	
Numerical Study on Low Reynolds Number Heat Transfer in Alternating Elliptical Axis Tube.....	592
Meng Jian, Liang Xinggang, Li Zhixin, Guo Zengyuan	
Experimental Research and Numerical Simulation on Staggered Elliptic Tube Bundle.....	597
Zhang Yajun, Lou Xinrong, Deng Xianhe	
A Numerical and Experimental Investigation of Flow and Heat Transfer over Elliptic Tube Arrays with Compact Configuration.....	601
Chen Ying, Deng Xianhe, Li Zhiwu, Ding Xiaojiang	
Phase-Change Heat Transfer in Micro Capillary Grooves.....	608
Zhao Y.H., Tsuruta T., Yamamoto K., Hu X.G.	
Heat Transfer Characteristics of the Aluminum Integral Fin-Tube (AIF).....	614
Li Xiaoxin, Zhu Dongsheng, Deng Xianhe	
Optimizing Fin Performance Considering Convection, Heat Exchange and Structure.....	620
Yang Liming ,Chen Weihai	
Performance and Effect During Condensation of Nonazeotropic Mixtures in a Bundle of Petal-Shaped Finned Tube.....	628
Wang Nan, Zhang Zhengguo, Zhu Dongsheng, Qian Songwen, Zhang Zhi	
Heat Transfer Study of Aluminum Plate-Fin Heat Exchanger as Water-Air Heat Exchanger and Evaporator of R22.....	633
Li Shuhong , Zhang Xiaosong, Zhou Leping	
Experimental Study on Heat Transfer Enhancement in Natural Convection in Limited Space by	

Using Delta-Winglet Longitudinal Vortex Generators.....	641
Feng Guangchang, Yang Zeliang, Wang Tao	
The Heat Dissipation Reserarch of Electronic Apparatus in Minispace.....	645
Chen Baoming, Yun Heming, Zhang Liqiang, Geng Wenguang	
An Experimental and 2-D Numerical Analysis of the Thermal-Hydraulic Characteristics of the Converging-Diverging Tube.....	652
Chen Y., Deng X.H., Ding X.J., Wang Y.J., Li Z.W.	
Mass Transfer from Cylinders Rotating in Still Air.....	659
Turgay Pekdemir, Thomas William Davies	
Numerical Simulation of LEC Growth of INP Crystal.....	666
Li Mingwei, Zeng Danling	
Numerical Simulation and Field Synergy Analysis on Laminar Flow and Heat Transfer Enhancement in a Converging-Diverging Tube.....	672
Xiao Chunhua, Gui Yewei, Li Shumin, Zhu Guolin	
Heat Transfer Enhancement by Using Self-Oscillation.....	677
Zeng Danling, Gao Hong, Zeng Xianchuan, Liu Chao, Zheng Jun	
Pulsatile Flows: Effects of Frequency and Amplitude Changes on Heat Transfer.....	682
Dr. Mir-Akbar Hessami	
The Photocatalytic Degradation of Indoor Air Contamiants Using Thin Film TiO₂ Photocatalyst.....	691
Lu Yuangwei, Ma Chongfang, Xia Guodong, Wang Wei, Wang Chao, Chang Mengyuan	
Nummerical Simulation of Heat Transfer of Air Across Finned Tube-Banks.....	697
He Yaling, Zhang W., Tao Wenquan, Liu X., Song F.Q.	
Field Coordination Analysis on Air Convection Heat Transfer in Rectangular Channel with Magnetic Quadrupole Field.....	703
Yang Lijun, Ren Jianxun, Song Yaozu, Guo Zengyuan	
Preventing Fouling and Enhancing Heat Transfer Using the Dynaflow Twisted Strip with Dissymmetrical Oblique Teeth.....	710
Yu Tianlan, Yu Xiumin, Zhi Xiaoheng, Liu Guiying, Peng Deqi, Jiang Shaoqing, Liu Jizhao	
Numerical Predictions of Fluid Flow and Heat Transfer in Corrugated Channels.....	714
Xu Wei, Min Jingchun	
Theory and Application of Heat Transfer Enhancement by Fluid Induced Vibration.....	722
Cheng Lin	
Enhancement of Heat Transfer Over a Cylinder by Acoustic Excitation.....	727
Gau C., Yang C. S., Su H.S.	
Flow and Measurements of Micro-Scale Impingement Cooling Heat Transfer From a Micro Slot Air Jet.....	736
Shen C. H., Yang C. S., Gau Chie	
Performance Comparison Between Wire Coil and Twisted Tape Inserts.....	742
Karl Ponweiser, Marina Malinovec, Wladimir Linzer	
Heat Transfer of Several Materials at Cryogenic Temperature.....	751
Takayuki Tomaru, Kunihiko Kasahara, Takakazu Shintomi, Toshikazu Suzuki, Nobuaki Sato, Tomiyoshi	

Haruyama,Akira Yamamoto	
Experiment of Heat Transfer Enhancement and Performance Comparison of Strip Inserts in Heat Transfer Tubes.....	757
Peng Deqi, Zhu Dongsheng, Dai Jianjun, Qian Songwen	
Heat Transfer Augmentation for the Flow of Highly Viscous Fluids in Tubes Using Cross Trapezoid Wave Tape Inserts.....	761
He Lu, Zhu Dongsheng Fan Zhonglei	
Flow and Heat Transfer in LEC Growth of Gallium Arsenide.....	767
Li Mingwei , Zeng Danling	
Analysis About the Thermal Characteristics of Heat Sinks of Electronic Chips.....	773
Chen Xizhang, Liu Zhongliang, Ma Chongfang , Yu Jian	
Compound Heat Transfer Enhancement of Tube–Shell Heat Exchanger by Corrugated Tubes and Ultrasonic Vibration.....	779
Duan Xili, Qiu Xingqi, Chen Yanze	
Numerical Simulation on Heat Transfer Enhancement in Twisted-Tape-Inserted Tubes.....	787
Kazuhisa Yuki, Chikahiro Sato, Hidetoshi Hashizume , Saburo Toda	
Heat Exchangers In a CO₂ Automotive Air Conditioning System.....	795
Liu Hongsheng, Chen Jiangping, Chen Zhijiu	
Flow Map of a Slot Jet with a Cylinder in the Flow.....	801
Turgay Pekdemir, Thomas William Davies	
The Analysis of Heat and Mass Transfer for the Porous Wick in The CPL Evaporator.....	809
Huang Xiaoming, Liu Wei, Liu Zhichun, Han Yanmin	
Experimental Investigation of Convection Heat Transfer in Mini-Fin Structures.....	816
Jiang Peixue, Xu Ruina, Li Meng	
Flow and Heat Transfer Characteristics of Supercritical Carbon Dioxide in Multi-Port Extruded Mini Channels.....	822
Huai Xiulan, Shigeru Koyama, Zhao Tianshou, Kinoshita Hidehiko, Morita Masak	
The Numerical Simulation of the Flow and Heat Transfer for the Porous Wick in CPL Evaporator... .	833
Liu Zhichun, Liu Wei, Han Yanmine, Huang Xiaoming	
Study on Enhancing the Heat Dissipation in Flip Chip Electronic Packages.....	839
Zhang Kai, Manlung Sham, Xiao Guowei, Jang Kyo Kim	
Researches on the Performance of Steam Injector for Distribution-Heating System.....	845
Shao Shufeng, Yan Junjie, Liu Jiping, Zhang,Chunyu, Lin Wanchao	
A Novel Micro Cooling System for Electronic Device by Using Micro Capillary Groove Evaporator.....	852
Hu Xuegong, Zhao Yaohua, Yan Xiaohong,T.Tsuruta	
Preparation and Performance of the Novel Al³⁺ Doped Silica Gel Monolithic Adsorbent.....	859
Fang Yutang, Ding Jing, Fan Juan, Yang Jianping, Yang Xiaoxi	
Experimental Study on Water Recovery from Atmospheric Air in Succession Utilizing Rotary Adsorber.....	865
Ding Yunfei, Ding Jing, Yang Xiaoxi	
Heat and Mass Transfer Simulation on Solid Chemisorption Refrigeration System.....	871

Chen Li, Liao Dongliang , Fang Liguao	
Experimental Research on Preparation and Adsorption Properties of a New Composite Adsorbent.....	876
Zhao Zhaohui, Zhu Dongsheng, Li Jun	
Research on Vertical Water-Cooled Condensers of Fluidized-Bed of Internal Circulation with Bubble Cap Plate.....	880
Peng Deqi, Zhi Xiaoheng, Yu Xiumin, Yu Tianlan, Liu Guiying, Jiang Shaoqing, Liu Yueping	
Numerical Analysis of Marangoni Convection Inencapsulated Liquid Column Under Microgravity.....	885
Peng Lan, Li Yourong, Zeng Danling, Yan Qirong	
Matching of Chiller-Cooling Tower to Enhance Efficiency of Central Air-Conditioning Plant.....	892
Seow Ngie Tay, Kia Juan Phua	
Experimental Investigation on Fouling Performance of Corrugated Tubes.....	898
Xu Zhiming, Gan Yunhua, Yang Shanrang	
Performance Evaluation of Deep Spirally Corrugated Tubes for Shell-and-Tube Heat Exchangers.....	904
Ventsislav Zimparov, Plamen Penchev	
Modern Problems in Creating Compact Tubular Heat Exchangers.....	912
Genrikh Dreitser	
Applications of the Field Synergy Principle in Designing New Type Heat Transfer Enhanced Surfaces.....	921
Tao W.Q., He Y.L., Qu Z.G., Cheng Y.P.	
Numerical Verification of the Field Synergy Principle for Turbulent Flow.....	934
Min Zeng, Tao Wenquan	
Simulation Study on Heat Transfer, Flow Resistance and Flow Pattern in the Sine Fin Plate and Shell Heat Exchanger Pass.....	940
Pang Ming, Chen Baodong , Ding Wenbin	
Thermal Oscillation of Pulsating Heat Pipes, Effect of Channel Size and Working Fluids.....	946
Xu Jinliang, Zhang Xianming, Shi Huilie, Zhou Zhaoqiu	
Enhancement of Heat Transfer in Compact Heat Exchangers with Helical Tubes.....	953
Boris Dzyubenko, Genrikh Dreitser	
Simulating the Heat Transfer Performance of Looped Oscillating Heat Pipes by Artificial Neural Networks.....	962
Ma Yongxi, Zhang Hong, Zhuang Jun	
Development and Heat Transfer Model of Cracking Tower for Waste Tires.....	969
Jiang Jialing, Liu Baoqing, Liu Xiaolong, Chen Ling	
Simulating for Heat Pipe Heat-Sink of CDMA Base Station Power Module.....	975
Tao Hanzhong, Zhang Hong, Zhuang Jun	
Mathematical Model and Numerical Simulation of Helical Baffles Heat Exchanger.....	981
Shen Renjie, Feng Xiao	
Numerical Analysis of Local Heat Transfer Enhancement for High Temperature Heat Pipe Heat Exchanger.....	986
Sun Shimei, Zhang Hong, Zhuang Jun	
Thermal Conductivity of Ash Layer Including Radiative Heat Transfer.....	992

Yang Shanrang, Zhang Hailin, Xu Zhiming, Wang Jianguo, Sun Linfang, Wang Shenglong Ammonia Corrasion Analysis of Copper Tube Used in Low Pressure Heater and Experimental Research on Non-Copper Improvement.....	999
Liang Ping, Long Xinfeng, Lou Bo, Chen Guanghui, Zhuang Lixian, Tan Yingke The Experimental Studying on Fouling Resistances of Cooling Water in Condenser of Chiller.....	1005
Liu Jinping, Liu Xuefeng, Kong Qingjun, Du Yanguo An Investigation on Flow and Heat Transfer Characteristics in the Shell Side of Shell-and-Tube Heat Exchanger with Separated Baffles Parallel To Segmental Baffles.....	1012
Wang Yangjun, Deng Xianhe, Chen Ying, Li Zhiwu Simplified Analyses of Slug Flow in a Gravity Heat Pipe.....	1018
Tang Zhiwei, Yu Lei, Jiang Zhangyan, Ma Chongfang Heat Transfer Enhancement in Evaporative Condenser.....	1025
Jiang Xiang, Zhu Dongsheng, Shen Jialong Study on Heat Transfer Enhancement in Shell Side.....	1032
Shen Jialong, Zhu Dongsheng, Fan Jiangming, Qian Songwen Research and Development of Assembly Module of New Type High Efficient Energy Saving Heat Exchanger.....	1038
Liu Minshan, Dong Qiwu, Gu Xin Application of the Network-Centric CAD System of Heat Exchanger.....	1043
Dong Qiwu, Liu Minshan, Zhao Hongbing Study on the Multi-Fields Synergy in the Reactive Distillation Coupled with Membrane.....	1049
Tao Xianhu, Yang Bolun Experimental Study on Hydrocarbon Mixture Refrigerant R600a/R290 in Refrigerator.....	1054
Du Yaping, Lu Jing, Chen Hua, Sun Yong, Yin Congxu Experimental Investigation on Performance of Flat Miniature Heat Pipes with Three Kinds of Micro Grooves.....	1058
Fan Chunli, Qu Wei, Sun Fengri, Yang Li, Ma Tongze An Experimental Research on Convective Heat Transfer on the Surface of Low Speed Rotating Horizontal Circular Cylinder.....	1063
Yang Zeliang, Zhuo Xianrong, Song Yaozu Film Cooling Performance and Heat Transfer Over An Inclined Film-Cooled Surface at Different Divergent Angles with Respect to the Highly Turbulent Mainstream.....	1067
Yang C.S., Lin C.L. Gau C. Design and Calibration of a Miniature Thin-Film Heat-Flux Gauge.....	1076
Yang Sujun, Xiao Jinsong, Ma Chongfang A Thermodynamic Criterion For Designing and Optimizing Heat Transfer Systems.....	1079
Wang Songping, Chen Qinglin, Yin Qinghua, Hua Ben Performance Evaluation and Parametric Study of an Irreversible Carnot Refrigerator Based on the Thermoeconomic Criterion.....	1086
S.K. Tyagi, Chen Jincan, Hua Ben National Standard: Exergy Analysis Technical Guide and its Revision.....	1092