

# Advanced Materials & Sports Equipment Design

Selected, peer reviewed papers from the 2013 International Conference on Advanced Materials & Sports Equipment Design (AMSED 2013), September 21-23, 2013, Singapore

von

Dehuai Yang, Tianbiao Zhang, Qi Luo

1. Auflage

[Advanced Materials & Sports Equipment Design – Yang / Zhang / Luo](#)

schnell und portofrei erhältlich bei [beck-shop.de](http://beck-shop.de) DIE FACHBUCHHANDLUNG

Thematische Gliederung:

[Sport, Sportwissenschaft](#)

Trans Tech Publications 2014

Verlag C.H. Beck im Internet:

[www.beck.de](http://www.beck.de)

ISBN 978 3 03785 902 5

# Table of Contents

## Preface and Organizing Committee

## Chapter 1: Materials and their Application

<b>Comparison of Effective Thermal Conductivity of Hollow Fibers by Prediction Models and FE Method</b>	
G.C. Zhu, J. Militký, Y. Wang, J. Huang and D. Kremenakova	3
<b>Structural State and Mechanical Characteristics of the ZrN Films Prepared by Sputtering</b>	
C.C. Liu, K.I. Liu, Y.C. Chou, Y.M. Cheng and C.L. Lin	9
<b>Rheological Fluids for Energy Absorbing Systems</b>	
M. Leonowicz, J. Kozłowska and Ł. Wierzbicki	13
<b>Preparation and Characterization of Poly(lactic acid) with Different Molecular Weights by Thermal Hydrolysis</b>	
J.Y. Yao, L.T. Lim and Y.J. Li	19
<b>Influence of Stark Effect and Quantum Wells Thickness on Optical Properties of InGaN Laser Diodes</b>	
S.G. Dong and G.J. Chen	25
<b>Stepwise Inhibition Effect of Multinitroxyl Radicals on Styrene Polymerization</b>	
R. Horng and S.K. Lee	31
<b>Experimental Investigation of Nano-Composite Coated Stainless Steel (316L) Surfaces under Unidirectional Sliding</b>	
R. Suresh, P. Shruthi, R.S. Kumar, J. Siva, M.P. Ananth and R. Ramesh	37
<b>Comparison of Machinability of Glass/Jute Fabric Polymer Composites</b>	
V. Sridharan, N. Muthukrishnan and S. Deivanayagam	42
<b>Preparation and Actuation of Electro-Active Artificial Muscle Based on Sulfonated SEBS</b>	
Y. Shi, R.R. Li, H.Q. Lian, X.G. Cui and Y. Liu	47
<b>Synthesis of the Mono-Disperse Magnetic Cross-Linked Composite Micro-Spheres Containing the Functional Group</b>	
J.L. Zhao and R. Yin	50
<b>The Study of New Type of Double Metal Nanofluids Suspension Stability</b>	
Q.Q. Hou, X.M. Pan and W. Zheng	54
<b>Study on Optical Properties of Carbon Nanoparticles</b>	
P. Ge	61
<b>VOCs Sensing Property of Graphene Oxide Thin Film by Reduction Rate</b>	
H.S. Ahn, H.J. Park, J.H. Oh, J.C. Joo and D.J. Kim	64
<b>The "Black Revolution" of Sports Equipment: Application of Carbon Fiber Reinforced Plastics (CFRP)</b>	
Q. Zhang	69
<b>Analytical Test Methods Used to Characterize Granular Composite Sport Surface Materials</b>	
J.W. Bridge, C.A. Mahaffey and M.L. Peterson	74
<b>Correlation of Fe-Rich Defect Centre and Minority Carrier Lifetime in p-Type Multicrystalline Silicon</b>	
M. Jahangir Alam and M. Ziaur Rahman	82
<b>Wear Behavior of Zirconium Oxide (ZrO<sub>2</sub>) Coating over the Surface of Electro Less Nickel Plating on Tool Steel Substrate</b>	
P.M. Madhankumar and S. Ilaiyavel	88
<b>Stress and Strain Characteristics of Aluminum Equal Channel Angular Pressing</b>	
J.H. Li, Z.J. Yu, D.P. Jiang and W. Chen	92
<b>Recovery of Valuable Metals from Spent Hydrogenation Catalysts</b>	
A.Y. Xu, T. Ye and S.H. Zhao	97
<b>Aluminum Lithium Alloys (Al-Li-Cu-X)-New Generation Material for Aerospace Applications</b>	
B. Ahmed and S.J. Wu	104

<b>Decay of Phosphorescent Warning Design on Textile Substrates</b> M. Vik, M. Vikova and M. Kasparova	112
---	-----

## Chapter 2: Biochemistry and Medicine

<b>A Research of the Microfluidic Cell Chip Technology to Reduce Urine Cells Overlap Rate</b> G.X. Su, P. Ge, J.J. Song, H.M. Ding, J. Lan, J. Sun and X.G. Sun	121
<b>Microwave Assisted Extraction, Chemical Components and Antibacteria Activity Study of <i>Thymus monoglicus</i> Ronn Essential Oil</b> G.X. Sun, Y.Q. Miao, X.J. Gu and J.L. Shi	127
<b>The Application of RFID in the Field of Medical Circulation</b> R. Liu, Y.L. Zhang and Y.J. Niu	131
<b>Comparing 3 Different Foot Models for Ankle Joint Motion during Gait</b> H.B. Liu, Z.Q. He, W.X. Yuan and Z. Yang	135
<b>The Effect of Heart Rate Variability on Exercise Training Post-Cardiac Surgery</b> S.C. Lin, H.C. Chen, S.W. Lin, W.C. Hong, W.L. Huang, H.T. Lin and H.L. Li	140

## Chapter 3: Engineering Research

<b>Outer Conductor Inner Diameter Measuring System of Coaxial Transmission Line</b> H.Y. Ye and Y.Z. Zheng	147
<b>Forced Vibration Behavior of Self-Piercing Riveting Joints</b> X.C. He, D. Zhen, B.Y. Xing, K. Zeng, F.S. Gu and A. Ball	153
<b>Numerical Studies on Laser Welding Process</b> X.C. He	158
<b>Effect on Deformation in Hydroforming under Different Forming-Control Paths</b> W.K. Ricky Kot and L.C. Chan	165
<b>The Research on Working Performance of Annular Valve Spring Based on Solidworks</b> X.B. Li, X.L. Chen and J. Zhang	171
<b>Effect of Thread Helix Angle on the Axial Metal Flow of Cross Wedge Rolling Thread Shaft</b> H.J. Yan, L.J. Wang, Y.Z. Liu, G.C. Li, J.P. Liu and Z.H. Hu	177
<b>Computer Aid of Mechanism Behaviour</b> K. Monkova, V. Fecova and Z. Hutýrová	182
<b>Technological Process Design and Simulation</b> P. Monka and S. Hloch	188
<b>An Ergonomic Computer Mouse for Professional Designers</b> A. Faraji and M.R. Farahmand	194
<b>Linear Peristaltic Pump Device Design</b> A. Faraji, M. Razavi and N. Fatouraee	199
<b>Simulation of the Screw Thread Connection Temperature Field Based on ANSYS</b> F. Sun, X.L. Wu, S.F. Yao and G.Y. Liang	204
<b>Intelligence Fusion Strategy of Forming Process Control for Sport Equipment in Rubber Products</b> B. Bi and L. Li	210
<b>Design and Realization of a Pipeline and Slot Multi-Function Robot</b> Z.M. Yang, G.Q. Zhang and J.J. Zhen	216
<b>Development of Test System for Subsea Tree Equipment</b> B.P. Cai, Y.H. Liu, Y.T. Zhang, J.T. Ma, Y.W. Zhang, Y.J. Zhuang, P.W. Lu and Y.G. Luo	222
<b>Flow Measurement in Hydraulic System Using Acoustic Emission</b> G.Y. Wang and X.X. Chen	228
<b>Research into Cleaning and Suppression Equipment to Improve Reliability of Hydraulic System</b> S.H. Wang, L.J. Cao, G.B. Yu, Z.H. Yang and J.Z. Zhi	232
<b>Criteria for Recognition of Wheel Skid of Trains Based on Time Series Analysis</b> J.B. Peng, X.Y. Hu and Y.J. Liu	237

<b>Transmission Study of Planetary Gear Mechanism Based on Matrix Theory</b> Q.H. Zhao, X.P. Wu and B.H. Shu	243
<b>Novel Steam Powered Gravity Assisted Standalone Power System (SP-GA-SP System) Design for Remote Wireless Sensor Networks</b> P.S. Perumal, V.R. Uthariaraj and V.R.E. Christo	248
<b>Experimental Investigation of Homogeneous Charge Compression Ignition Engine of Ethanol and Diesel Blends</b> S. Natarajan, N.V. Mahalakshmi and S. Sundarraj	254
<b>Colorimetric Properties of Photochromic Textiles</b> M. Vikova and M. Vik	260
<b>The Comparison of the Oil-Water Retained Rate between the Different Style Plates</b> C.T. Yeh, T.M. Ma, S.C. Lin, T.W. Lin, H.C. Chen and W.C. Hong	266
<b>Trends in Joining Dissimilar Metals by Welding</b> P. Kah and M.S. Jukka Martikainen	269
<b>On the Throughput-Reliability Tradeoff Analysis of Broadcasting Protocol in VANETs</b> L.J. Li, H.F. Liu and B.H. Ma	277
<b>OPNET-Based Simulation and Research of Communication Network Performance in Digital Traction Substation</b> G.R. Liu, Y.H. Luo and Y. Zhou	283
<b>Node Localization Algorithm Based on DV-HOP in Wireless Sensor Networks</b> J. Zhang, H.B. Wang, X.G. Qiao and Y.Q. Han	289
<b>The Study on Wireless Location Based on SQLite Database and ZigBee Technology</b> C. Zhu, G. Du, Y.T. Gou and Q. Li	293

## Chapter 4: Development of Sport Equipment

<b>Development and Application on Double-Ball Exercising Device for Table Tennis</b> X.H. Zhang and M. Yang	301
<b>Design and Application on the Rolling and Coordinate Type Device of Table Tennis</b> M. Yang and X.H. Zhang	305
<b>Safety Device Applied in the Weight Belt for Recreational Scuba Dive</b> L.T. Kawamoto Jr. and W.O. Kawamoto	309
<b>High Speed Golf Ball Impact on a Substrate</b> D. Pincott and A.S. Blicblau	314
<b>Research on the Evolution of Golf Equipment Development</b> X.Y. Shao and X.R. Chen	320
<b>Baseplate of Table Tennis Racket: Allocation for Material Innovation and Playing Methods</b> M.L. Yang	325
<b>The Development of the Rugby Scrum Training Equipment</b> J.R. Teng, Y.W. Song and T. Wang	329

## Chapter 5: Computer Technology in Sports

<b>Hardware Design of College Students' Physical Activity Energy Monitor</b> Q. Luo and W.T. Zheng	335
<b>Table Tennis Training Intelligent Assessment System Based on Placement Identification</b> R.G. Ma and H.W. Xing	341
<b>Software to Train Scuba Dive Procedures</b> L.T. Kawamoto and A.F.F. Slaets	346
<b>The Application of Virtual Reality Technology in Rope-Ladder Training</b> T.C. Cui, Y.Q. Peng and Y. Sun	354

## Chapter 6: Applied Research in Sport

<b>The Efficacy of Impact-Absorbing Materials during Collision with a Soccer Ball</b> Z. Taha, M.H.A. Hassan and M.A. Aris	363
---	-----

---

<b>A Low Cost 3D Foot Scanner for Custom-Made Sports Shoes</b> Z. Taha, M.A. Aris, Z. Ahmad, M.H.A. Hassan and N.N. Sahim	369
<b>The Research of the Design for Stadium with Movable Seating and its Structure - Based on the Products from Ling Xian</b> G.H. Wei and W.D. He	373
<b>Analysis on Sports Shoes Design under the Guidance of the Green Design Concept</b> L.N. Cui	379
<b>Grey Relational Analysis on Different Phases of Men's 100m Dash</b> W.H. Shen, X.F. Wang and C.M. Huang	383
<b>Four Girls Mountains Savage Peak Climbing Theme Attractions Design</b> J.P. Shu, S.P. Fu and X.Y. Wen	387
<b>Analysis on Issues in Sports Equipment Management and Countermeasures in Guizhou Colleges and Universities</b> L. Zhang, G.H. Yao and K.Y. Yao	392
<b>Study on Public Sports Facility Layout Planning</b> T.H. Sun	397
<b>Application of Imagery Training Method in College Table Tennis Elective Course</b> S.P. Xu	402