

3rd International Symposium on Mechanics, Structures and Materials Science (MSMS 2022)

MATEC Web of Conferences Volume 358 (2022)

Tianjin, China
23 - 24 April 2022

Editors:

**Jun Xiao
Xinwang Wu**

ISBN: 978-1-7138-5350-3

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

This work is licensed under a Creative Commons Attribution 4.0 International License. License details:
<http://creativecommons.org/licenses/by/4.0/>.

No changes have been made to the content of these proceedings. There may be changes to pagination and minor adjustments for aesthetics.

Printed with permission by Curran Associates, Inc. (2022)

For additional information, please contact EDP Sciences – Web of Conferences at the address below.

EDP Sciences – Web of Conferences
17, Avenue du Hoggar
Parc d'Activité de Courtabœuf
BP 112
F-91944 Les Ulis Cedex A
France

Phone: +33 (0) 1 69 18 75 75
Fax: +33 (0) 1 69 28 84 91

contact-edps@webofconferences.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

The Effect of Nb Content on Microstructure Evolution of GH4169 Superalloy During Hot Deformation.....	1
<i>Chen Wen, Zhang Peng, Xie Jing, Liu Yang, Zhao Wenxia</i>	
Preparation of High-Barrier Polyethylene Terephthalate Bottle by Microwave Plasma Enhanced Chemical Vapor Deposition	7
<i>Yin Lianhua</i>	
Inspection and Treatment of Four Pipe Supports and Hangers of 350MW Unit.....	12
<i>Yuan Tangqing, Jian Liangliang, Li Jidong, Chen Yang, Jian Mingjian, Zhang Huakai</i>	
Thermal Decomposition of Epoxy Resin Under SF6 Atmosphere	17
<i>Yang Ren, Yang Hongyu, Wu Yuhua, Lin Dezhi, Xue Jun, Zhang Xiao, Zhang Weiqiang</i>	
Synthesis of Silver Coatings by Brush Plating with Cyanide-Free Solution	22
<i>Du Baoshuai, Zhang Zhongwen, Suo Shuai, Li Xinmei</i>	
Cause and Mechanism Analysis of Cracking and Leakage of Water Wall Tube	26
<i>Zhao Jie, Song Fangyuan</i>	
Dynamic Balance Design and Simulation Verification of Reed System of Loom Beating Up Mechanism	30
<i>Wang Kang, Guo Sai</i>	
Detection Method of Heterotropic Fiber Based on Improved YOLOv5	34
<i>Zuo Hengli, Du Yuhong</i>	
Experimental Study on Tribological Properties of Polymer-Based Composite Nano-Additives Suitable for Armored Vehicle Engine Lubricating Oil.....	39
<i>Fan Bingli, Li Zhengjie, Sun Annan, Guo Yiwei, Qi Xiaowen, Liu Changxin</i>	
Study on Critical Concentration of Dynamic Gelation of New Chromium Crosslinker.....	47
<i>Cao Ruibo, Liu Guochao, Chen Wenlin, Hu Liangfeng, Yan Wei, Liu Haibo</i>	
Study of Quantitative Structure-Property Relationship for Density of Ionic Liquids Based on Monte Carlo Optimization	51
<i>Jia Xingang, Wang Wenzhen, Yang Bo, Du Chunbao</i>	
Research on Rock Triaxial Cyclic Loading and Unloading Characteristics Based on PFC3D	57
<i>Qi Ziyuan, Xiao Jiancheng, Lu Jingjing, Zhou Hui, Wang Huaguo</i>	
Cause Analysis of Surface Micro-Cracks on 12Mn Pipeline Steel.....	64
<i>Tian Yushi, Chu Shaoyang, Xu Lijun, Wei Jun, Qiu Shengtao, Zhu Rong</i>	
Research on a Mechanical Model of Coal and Rock Around Well Based on Variable Temperature.....	70
<i>Yu Sheng, Zhang Jie, Li Xin, Li Cuinan, Li Rongxin</i>	
Infrared Spectroscopy Method for Detecting the Content of Antioxidant Irganox 1076 in Polypropylene.....	74
<i>Zheng Qiukai, Fan Jingjing</i>	
Preparation of Nano α-Fe₂O₃ and γ-Fe₂O₃ and Used for Elemental Mercury Removal	78
<i>Tan Zengqiang, Kong Fanhai</i>	
Immobilizing Metallocene by Solid Polymethylaluminoxane “sMAO” for Slurry-Phase Ethylene-1-Hexene Copolymerization	82
<i>Wu Chaofan, Ge Tengjie, Jiang Zeyu, Jiang Yanfeng, Zhang Qian, Li Jian</i>	
A Verticality Adjustment Technology for API1000 Refueling Machine Mast	86
<i>Zuo Changdi, Dong Jianlei, Zhao Haidong, Xie Jun, Mu Di</i>	
Stress Analysis of Floating Photovoltaic Power Plants Under Wind Conditions in 8x8 Arrangement.....	90
<i>Yuan Bingqing, Bei Yaoping, Zhang Mingyu, Deng Xia</i>	
Simulation Analysis of Single Solar Floating Photovoltaic Panel Structure Based on Wind Direction Change	94
<i>Bei Yaoping, Yuan Bingqing, Feng Fei, Deng Xia</i>	
Study on the Synthesis of Water-Dispersible Acrylic Resin Containing Hydroxyl Group`	99
<i>Jing Ma, Rong Mu, Lai Daowei, Li Huaming, Tao Yong, Fei Xiao, Zhou Chunyu, Sun Chufeng</i>	
Study on Mechanical Properties of Traffic Pavement Materials Under Fatigue Loading.....	103
<i>Feng Guotong, Wang Wenqing, Ma Liuting, Liu Fengjun</i>	
Effect of Annealing Temperature on the Photocatalytic Performance of ZnO@MoS₂ Composite Materials.....	108
<i>Yang Weijia, Liu Lihua, Zhao Jingjing, Guan Zeyi, Lu Bingshang, Wang Fengming, He Xin, Fu Yuechun</i>	

Self-Assembly of ZnO Nanodots on Glass Substrates by a Facile Sol-Gel Method	112
<i>Yang Weijia, Zhao Jingjing, Liu Lihua, Guan Zeyi, He Xin</i>	
Preparation and Characterization of a Novel Emphatically Charged Strengthened Chitosan Composite Nanofiltration Membrane	118
<i>Mu Tao, Wang Qiang, Cao Liang, Zhu Xiaohang, Zhao Zhiru</i>	
Study on Preparation and Performance of Additive Flame Retardant DOPO-HQ Modified Epoxy Composite	122
<i>Wang Chenghui, Wang Lele, Zhang Yingqiang</i>	
Self-Assembly of Dumbbell-Shaped Supramolecules with Simulated Annealing and Monte Carlo Simulation	126
<i>Du Bo, Wang Qing, Li Congying, Li Hong</i>	
Property and Structure Characterization of High Molecular Weight Polyacrylonitrile Polymers Initiated by 2,2'-Azobis (2-Methyl Propionamide) Dihydrochloride Using Aqueous Deposited Polymerization Technique	130
<i>Zhao Yaqi, Liang Banglei, Zhao Zhenxin, Feng Qiao</i>	
Rapid Determination of Antioxidant Irganox 1076 in Polyethylene	137
<i>Zheng Qiukai, Hu Dan, Fan Jingjing</i>	
Methods and Exploration for Mechanical Testing and Microscopic Testing of Loess Under Freeze-Thaw Cycles	141
<i>Liu Qingbo, Zhao Kai, Zhao Laishuan, Wang Linhao</i>	
Exploration on Mechanical Test Method of Improved Loess Under Dry-Wet Cycles	146
<i>Zhao Laishuan, Wu Tiehai, Yu Shijie, Rong Baogui</i>	
Influence of Preparation Conditions on the Physical Structure and Surface Properties of Enteromorpha Clathrate Bio-Char	151
<i>Liu Lu, Zheng Yali, Gong Peng, Shao Guangcai, Huang Xu</i>	
Research Progress of Water-Based Release Agents	156
<i>Liang Bo, Yang Ye, Li Junping</i>	
Nonlinear Error Control of Five-Axis Machining Singular Region	161
<i>Chen Liangji, Liu Zhi, Li Zhiguang, Wei Zisen</i>	
Optimization Method for Complex Surface Partitioning and Cutting Parameters in 5-Axis Machining	166
<i>Chen Liangji, Li Zhiguang, Liu Zhi, Wei Zisen</i>	
Effect of Surface Insulation on Thermal Stress of Concrete	170
<i>Xin Jianda, Liu Yi, Wang Juan, Wang Zhenhong, Jiang Xiaoming, He Dingquan, Jiang Huaiyu, Hou Wenqian, Zhang Shixi</i>	
Preparation and Thermal Conductivity of FG/PP Composites	174
<i>Zhou Haijun, Zhang Xiaolei, Zhou Mengmeng, Wang Zhengzheng, Chen Xiaoqi, Zhang Fen, Xiao Jijun, Li Yantao</i>	
Statics and Modal Analysis of Main Frame of Composite Board Detaching Sleeve Equipment	178
<i>Zhu Wenchang, Hu Guangzhong, Bin Quiyue, Liao Junjie, Xu Haoming</i>	
Design and Optimization of Elevator Car Bottom Structure	184
<i>Huang Naiqiu, Song Mengmeng, Xiao Shungen, Zheng Zhipeng</i>	
Stress Analysis of Pipelines with Small Misalignment Under Internal Pressure Using Fast Modelling System ABAP	189
<i>Yan Sunting, Liu Zhongqiang, Hu Jiansheng, Chen Yonggui, Shen Xiaoli, Teng Guoyang</i>	
Study on Serviceability of Transition Section Between Road and Tunnel	193
<i>Zhong Chonghui, Cheng Bingwei, Wang Linhao, Yu Shijie</i>	
Analysis of Mechanical Properties of Loess with Cement Incorporation Ratio	198
<i>Rong Baogui, Liu Qingbo, Mei Gang, Cheng Bingwei</i>	
Analysis of Mechanical Properties of Loess with Lime Incorporation Ratio	204
<i>Wu Tiehai, Jia Zhao Feng, Rong Baogui, Zhao Laishuan</i>	
Effect of Different Replacement Depth on Slope Stability of Roadbed	210
<i>Jia Zhao Feng, Liu Yu, Rong Baogui, Ling Pingyu</i>	
Research Progress in Characterization Methods of Anti-Corrosion and Wear-Resistant Polyurethane Coatings	214
<i>Jia Xinghui, Song Xiwen, Fan Jinjuan, Sun Wei, Liu Changkui</i>	
Preparation and Characterization of High Temperature Resistant Polyimide Films	222
<i>Li Zhirui, Hou Yong, Ma Pengchang, Zhao Wenhua</i>	
Research on Photo Catalytic Performance of TiO₂ Film Doped with Li⁺	226
<i>Zhang Jing, Huang Zhengxing, Zheng Liming, Tian Xiaobo, Yin Wengang, Ding Shihua</i>	
Influence of Surface Crack Propagation on Ring-Shell Structure	230
<i>Lin Haichao</i>	
Kinematic Simulation of Automatic Conveying and Stamping Machine Based on UGNX	239
<i>Liang Wenyue, Zhan Xianghui</i>	

Effect of Ultrasonic Wave on Coating and Corrosion of ZK60 Magnesium Alloy	243
<i>Zhang Nana, Tong Zhibo, Li Hongyan, Liu Shichang, Li Qing, Xie Qiuyan, Ding Jianbo</i>	
Modulating Anionic Activities in Layered Li-Rich Cathode Materials with Inverse Spinel MnFe₂O₄ Coating.....	247
<i>Bao Liying, Zhu Xinyu, Li Ning, Li Yongjian, Xu Lifeng, Chen Lai, Cao Duanyun, Lu Yun, Su Yuefeng, Fang Youyou, Yang Chenxing, An Ran</i>	
Research Status and Prospect of Dissimilar Light Alloy Welding Technology	252
<i>He Xiaohui, Liu Bin, Zhou Xiong, Li Cheng, Zhang Xuhui, Chang Junjie</i>	
Effect of Different Active Materials on WAAM Depth of Penetration and Weld Morphology	257
<i>Huang Yunfeng, Shi Xuezhi</i>	
Study on the Organization and Properties of medium-Mn Steel with V	261
<i>Yang Hongru, Liu Xiaoyan</i>	
In Situ Preparation of Thermotropic Liquid Crystalline Polyester and Nylon 10T	265
<i>Rong Ze, Chen Shiyu, Xu Hanwen, Yang Xiaoping, Wang Haojing, Li Yuanzhe</i>	
Preparation and Properties of Sn-TiO₂ Nanocomposite Coatings	270
<i>Zhang Shengping</i>	
Research Progress in the Preparation of Phosphor for White Light Emitting Diode	274
<i>Li Xueye</i>	
Theory Study of H₂O Adsorbed TiO₂ (110) Surface: Structural and Electronic Properties	280
<i>Zhong Siying, Wu Shaoyi, Chen Xiaohong, Xu Kailai</i>	
Research on Influencing Factors of Fatigue Performance of Cruciform Welded Joints on Offshore Platforms	284
<i>Li Da, Su Yunlong, Bai Xueping, Peng Chentao, Xu Lianyong</i>	
Dielectric Properties of Polypropylene by Deashing Method for DC Polymer Film Capacitors.....	291
<i>Xing Zhaoliang, Zhang Chong, Dai Xiying, Li Fei, Xiao Yu, Li Jian</i>	
Experimental and Simulation Research of Belt Extrusion Process Based on Simplified Chip Model.....	295
<i>Liu Qi, Wang Yuwei, Zhao Na, Zhu Wenfang</i>	
Experimental and Simulation Research on the Quasi-Dynamic Extrusion Process of the Belt	301
<i>Liu Qi, Wang Yuwei, Zh Wenfang, Zhao Na</i>	
Study on Recrystallization Process of Poly(DL-Lactide)/Poly(ethylene Glycol) Diblock Copolymer	309
<i>Chen Xiaoqi, Bai Lu, Li Chengyu, Tian Jia, Zhou Haijun, Zhou Mengmeng, Xiao Jijun, Li Yantao</i>	
Synthesis of a Copolymerization and the Anti-High Temperature Property in Oil Well Cement Slurry Fluid	313
<i>Wang Wenbin, Wan Xiangchen, Tang Kai</i>	
Finite Element Simulation of Graphene Thermal Conductivity Framework	317
<i>Yang Jun</i>	
Molecular Dynamics Study on the Effect of Doping Defects on the Properties of CL-20/HMX Co-Crystal Explosive	321
<i>Yang Jiahao, Wang Yuling, Wang Chengzhou</i>	
Research on the Influence of the Geometric Characteristics of Surrounding Rock Fractures on the Macroscopic Mechanical Properties of Rock-Like Materials Based on PFC	326
<i>Zhu Xiaoye</i>	
Microwave-Assisted Synthesis of Greigite Fe₃S₄ Nanosheets Wrapped in an rGO Matrix as Anode Material for Sodium-Ion Batteries	336
<i>Choi Ikhwan, Liu Bolin, Zhu Youqi, Cao Chuobao</i>	
Author Index	