

7th Annual International Conference on Material Science and Environmental Engineering (MSEE 2019)

IOP Conference Series: Materials Science and Engineering
Volume 735

Wuhan, China
15 - 16 November 2019

ISBN: 978-1-7138-2653-8
ISSN: 1757-8981

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 3.0 International Licence.
Licence details: <http://creativecommons.org/licenses/by/3.0/>.

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. (2021)

For permission requests, please contact the Institute of Physics
at the address below.

Institute of Physics
Dirac House, Temple Back
Bristol BS1 6BE UK

Phone: 44 1 17 929 7481
Fax: 44 1 17 920 0979

techtracking@iop.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

MATERIAL SCIENCE AND ADVANCED MATERIALS

EFFECTS OF PT CONTENT ON ROOM-TEMPERATURE HYDROGEN SENSING CHARACTERISTICS OF PT-SNO ₂ NANO-COMPOSITE CERAMICS	1
<i>Caochuang Wang, Pengcheng Li, Yongming Hu, Liqun Xu, Zhen Zhou, Wanping Chen</i>	
EXPERIMENTAL STUDY ON MODIFIED SHIELDING FUNCTIONAL MORTAR.....	7
<i>Yi Gao, Yingjian Lu, Jing Huang</i>	
EFFECT OF SURFACE BURNISHING TREATMENT ON MICROSTRUCTURE AND WEAR PERFORMANCE OF ZK60 MAGNESIUM ALLOY	15
<i>Haiquan Zhang, Yichen Liu, Peiquan Guo</i>	
PREPARATION AND CHARACTERIZATION OF SUBMICRON TiO ₂ MICROSPHERES VIA UREA-FORMALDEHYDE TEMPLATE	21
<i>Shaosen Lin, Shiguo Du, Yanling Lu</i>	
ANALYTIC SOLUTIONS OF TWO-PHOTON RABI MODEL BASED ON BARGMANN SPACE	26
<i>Zhanyuan Yan, Xuemin Yao</i>	
PROVIDING A LONG-TERM PROTECTION FOR NCM811 CATHODE MATERIAL BY AL ₂ O ₃ COATING LAYER.....	31
<i>Jing Wang, Qiang Yuan, Ran Wang, Guoqiang Tan, Yuefeng Su, Danhua Li, Feng Wu</i>	
RESEARCH PROGRESS ON HIGH-TEMPERATURE OXIDATION OF AUSTENITIC STAINLESS STEEL FOR ULTRA-SUPERCRITICAL BOILERS.....	37
<i>Tao Song, Zhiwu Wang</i>	
CHINA NETWORK PUBLIC OPINION GUIDANCE RESEARCH HOTSPOTS AND DEVELOPMENT SITUATION ANALYSIS-QUANTITATIVE ANALYSIS BASED ON CITESPACE KNOWLEDGE MAP.....	43
<i>Yanfang Liu, Pengyao Wang</i>	
EFFECTS OF MAGNESIUM-CALCIUM ALLOYS WITH DIFFERENT CALCIUM CONTENT ON THEIR MECHANICAL PROPERTIES.....	53
<i>Yanan Wang, Guodong Liu, Yukun Wei, Yang Qiao</i>	
RESEARCH ON PREPARATION PROCESS OF GRAPHENE BY MODIFIED BALL MILLING AND ITS THERMAL PROPERTIES	59
<i>Quanmao Yu, Qiurong Liu, Xiaoxia Li, Zhong Chen, Tao Ren, Zhenyu Chen, Zhengyi Huang</i>	
COMPATIBILITY OF AGENTS FOR POLYMER-BEARING PRODUCED WATER FROM OILFIELD	64
<i>Limei Sun, Jiajun Xu, Wenxian Xie, Ting Yao, Haigang Zhou</i>	
FABRICATION OF Bi ₂ MOO ₆ PHOTOCATALYTIC FIBERS VIA WET SPINNING AND ENHANCED PHOTOCATALYTIC ACTIVITY.....	70
<i>Jun Sun, Yan Zhang, Xiaobing Tian, Meijun Yang, Xiaolong Yang, Jianqiang Yu</i>	

PREPARATION AND CHARACTERIZATION OF NEOPENTYL GLYCOL/EPOXY RESIN SHAPE-STABILIZED PHASE CHANGE MATERIAL FOR THERMAL ENERGY STORAGE	79
<i>Duo Meng, Kang Zhao, Anqi Wang, Wei Zhao</i>	
PREPARATION AND ELECTROCHEMICAL PERFORMANCE OF POROUS SI/SIOX/G COMPOSITE ANODE FOR LITHIUM ION BATTERIES.....	86
<i>Jing Wang, Xiaoyan Zhang, Ran Wang, Guoqiang Tan, Yuefeng Su, Feng Wu</i>	
APPLICATION OF TRACE PROPERTY IN FIRE CAUSE IDENTIFICATION	93
<i>Liantie Wang, Qingshan Meng</i>	
CUINS2 QUANTUM DOTS-BASED OFF/ON PROBE FOR DETECTION OF CETYLTRIMETHYLAMMONIUM BROMIDE AND L-CYSTEINE.....	96
<i>Yitong Liu, Zhongkai Guo, Qunxi Tai, Zaiqian Tu, Hanyu Bai, Siyu Liu</i>	
STUDY ON PREPARATION AND PROPERTIES OF MODIFIED FUNCTIONAL MORTAR MIXED WITH REDUCED IRON POWDER	101
<i>Yingjian Lu, Jing Huang, Yi Gao</i>	
DEVELOPMENT TREND OF LOW THERMAL CONDUCTIVITY CERAMIC MATERIALS	107
<i>Xiqian Luo, Bohan Guo, Xiaoqiang Wang, Zeyu Zhang</i>	
MICROSTRUCTURES, OPTICAL PROPERTIES AND DEGRADATION EFFICIENCY OF NITROGEN-DOPED TITANIUM DIOXIDE TO AUTOMOBILE EXHAUST	112
<i>Zhihui Hu, Wei Liu, Tao Xu, Xiaoyan Li</i>	
MAGNETISM OF UNDOPED ZRO2 NANOPARTICLES DEPOSITED BY PLASMA-GAS- CONDENSATION TECHNOLOGY.....	120
<i>Wenxin Zhou, Kangqi Lin, Laisen Wang, Qing Luo, Dongliang Peng</i>	
A REFINED MODEL FOR PREDICTING THE 31-COUPPLING EFFECT OF PIEZOELECTRIC STRUCTURAL FIBER COMPOSITES	126
<i>Yaoling Xu, Lishuang Zheng</i>	
STUDY ON HOT DEFORMATION BEHAVIOR AND CONSTITUTIVE MODEL OF TNTZ ALLOY	132
<i>Jing Cheng, Kelu Wang, Xin Li, Jianjun Liu</i>	
EFFECT OF ROLLING PROCESSING ON MECHANICAL PROPERTIES OF MATERIAL CR12.....	137
<i>Yichen Liu, Taoyuan Li, Haiquan Zhang, Peiquan Guo</i>	

MATERIAL ENGINEERING AND APPLICATION

SYNTHESIS AND ADSORPTION PROPERTIES OF INSOLUBLE STARCH XANTHATE (ISX).....	142
<i>Haihua Li, Lihui Zhang, Yuhua Gao, Zhenfa Liu</i>	
REGENERATED BAMBOO-DERIVED CELLULOSE FIBERS/RGO-BASED COMPOSITE FOR HIGH-PERFORMANCE SUPERCAPACITOR ELECTRODES	149
<i>Tianhao Wang, Wentao Zhang, Shujuan Yang, Weiqian Tian, Liping Zhang</i>	
COMPARISON IN CHEMICAL COMPOSITION OF LIME BINDERS BETWEEN SEVERAL TYPICAL ANCIENT BUILDINGS IN CHINA.....	158
<i>Peng Zhao, Xiuzhi Zhang, Lei Qin, Yunsheng Zhang, Hongwei Ren, Yinghui Lv, Gengle Liu</i>	

DESIGN AND EXPERIMENT OF DYNAMIC MEASUREMENT METHOD FOR BULK MATERIAL OF LARGE VOLUME BELT CONVEYOR BASED ON LASER TRIANGULATION METHOD	162
<i>Fusong Min, Andong Lou, Qun Wei</i>	
VOLUMETRIC DISPLACEMENT IN LARGE DEFLECTION OF SYMMETRICALLY LAYERED PIEZOELECTRIC PLATE UNDER PRETENSION	171
<i>Chunfu Chen, Hsiangjuei Yu</i>	
DESIGN AND IMPLEMENTATION OF FIXED LENGTH PROFILE CUTTING SYSTEM BASED ON MITSUBISHI Q SERIES AND CC-LINK FIELD BUS CONTROL	180
<i>Liqing Wang, Yimin Cheng, Xujie Hou, Chang Wang</i>	
STUDY ON THE CORROSION INHIBITION OF BENZOTRIAZOLE IN THE BLAST FURNACE GAS CONDENSATE WATER	188
<i>Yuhua Gao, Haihua Li, Lihui Zhang, Zhenfa Liu</i>	
MICRO-MECHANISM ON THE METAL MATERIALS WITH THE FATIGUE PROPAGATION	193
<i>Molan Li</i>	
DESIGN OF A DRIVE SCHEME FOR UNTETHERED MAGNETIC MANIPULATION POLISHING	198
<i>Xiaoqin Zhou, Haocheng Wang, Baoquan Sun, Yifei Wang, Xiaoyang Wu</i>	
EFFECTS OF COOLING CONDITIONS ON SURFACE INTEGRITY IN TURNING OF TC4 ALLOY	204
<i>Jianming Li, Taoyuan Li, Xiangyu Wang, Yang Qiao, Peiquan Guo</i>	
EXPERIMENTAL STUDY ON BASIC MECHANICAL PROPERTIES OF CALCIUM SULFATE WHISKER-REINFORCED CEMENT	210
<i>Xin Li, Liang Li, Chi Zhang, Yanyan Zheng</i>	
RESEARCH ON PREPARATION OF NANO-POROUS LITHIUM IRON PHOSPHATE FOR LITHIUM-ION BATTERY ELECTRODE MATERIALS	216
<i>Quanmao Yu, Tao Ren, Xiaoxia Li, Zhong Chen, Qiurong Liu, Zhenyu Chen, Zhengyi Huang</i>	
HYBRIDS OF NICKEL-HISTIDINE FUNCTIONALIZED GRAPHENE QUANTUM DOTS: FABRICATION AND NON-ENZYMATIC GLUCOSE SENSING	221
<i>Yongqiang Yang, Wei Chen, Qinsheng Wang, Qun Wang</i>	
SIMULATION STUDY OF THE EFFECT OF PROJECTILE LENGTH-DIAMETER RATIO ON ANTI-PENETRATION PERFORMANCE OF COMPOSITE ARMOR	228
<i>Yuanhao Zhang, Zhongqing Cheng, Yanru Li, Ruijie Han</i>	
SEISMIC RISK PROBABILITY ASSESSMENT OF FRAME STRUCTURES BASED ON INCREMENTAL DYNAMIC ANALYSIS	233
<i>Beibei Yang, Zhitao Wang, Donghui Ma</i>	
EFFECTS OF CU ²⁺ DOPING ON STRUCTURE, MORPHOLOGY AND PHOTOCATALYTIC HYDROGEN PRODUCTION PERFORMANCE OF POROUS CDIN ₂ S ₄ MICROSPHERE	244
<i>Xuefeng Bai, Wei Wu, Hongfei Lv</i>	
RESEARCH ON THE LOSING PROCESS OF THE TRADITIONAL GRAY BRICKS AND TILES	249
<i>Peng Zhao, Lei Qin, Xiuzhi Zhang, Yunsheng Zhang, Hongwei Ren, Yinghui Lv, Gengle Liu</i>	

DAMAGE PROCESS OF HIGH-PILED WHARF SUBJECTED TO UNDERWATER EXPLOSION.....	253
<i>Jinghan Liu, Ting Tang, Zhuobin Wei, Lingfeng Li</i>	
EFFECT OF REPEATED CUTTING ON LOW-FREQUENCY TORSIONAL VIBRATION TAPPING TORQUE.....	260
<i>Wenzhao Li, Zhizun Li, Fengqi Han</i>	
STUDY ON SHEARING CHARACTERISTICS OF CIRCUMFERENTIAL JOINT REBATE OF STAGGER-JOINTED SHIELD TUNNEL.....	267
<i>Cirong Lu, Huaizhi Zhou, Long Huang</i>	
THE SUPER-HARD CUTTING TOOLS' THERMAL-CRACKS MONITORING SYSTEM BASED ON MULTI-AGENT TECHNOLOGIES.....	275
<i>Cai fen Guo, Zhi Dong</i>	
DYNAMIC IMPACT LOAD EFFECT ON SUSPENSION CROSSING FRAME AT TRANSMISSION TOWER.....	280
<i>Ning Jia, Yongjun Xia, Yong Ma, Rongwang Zhang</i>	
PROGRESS AND CHALLENGES RELATED TO THERMAL FATIGUE RESEARCH OF SUPER-HARD CUTTING TOOLS.....	287
<i>Cai fen Guo, Zhi Dong</i>	
EFFECT OF THE PROPERTIES OF BASALT FIBERS AGING IN SALT SOLUTION.....	292
<i>Qichang Zhang, Tan Yan, Lida Luo, Qingwei Wang, Jin Liu</i>	
HIGH-TEMPERATURE CREEP BEHAVIOR OF 12CR1MOVG STEEL.....	300
<i>Jinping Pan, Chaoming Zhu, Xinwei Zhu, Lianjiang Tan</i>	
DESIGN OF IONIC FOG FILTER FOR AC-1 MACHINING CENTER.....	304
<i>Quan Zhou, Yonghui Xie, Juan Chen</i>	
FATIGUE PERFORMANCE OF T-JOINT WITH COMPLETE WELD DETAILS.....	308
<i>Xi Liu, Qingyu Meng, Can Wang, Song Huang</i>	
THE EFFECT OF ALUMINUM IONS ON THE ACIDIFICATION AND AGING OF PAPER.....	314
<i>Hongwei Zhang, Pengchen Zhai, Qinwen Wang, Yanqin Li, Aimin Tang</i>	
DESIGN AND IMPLEMENTATION OF A NEW CIRCUIT MAINTENANCE TRAINING PLATFORM.....	320
<i>Zelong Zhou, Xichun Shao, Zhuo Yang, Xiaochun Zhu</i>	
PREPARATION AND PROPERTIES OF POLY (SILICON-CONTAINING ARYLACETYLENE)/ATTAPULGITE FOAMS.....	327
<i>Jiadong Wu, Shilong Dong, Qiaolong Yuan</i>	
ASSEMBLING CONSTRUCTION TECHNOLOGY OF PREFABRICATED BOX CULVERT COMPONENTS.....	333
<i>Yumei Kang, Naiyuan Zhang, Tao Wang, Yuhang Song</i>	
COMPARISONS OF MODELS FOR PREDICTING PERMEABILITY FROM NUCLEAR MAGNETIC RESONANCE (NMR) LOGGING DATA IN HEAVY OIL-BEARING RESERVOIRS.....	339
<i>Wei Zhang, Qi Li</i>	

ENVIRONMENT PROTECTION AND SUSTAINABLE DEVELOPMENT

UNCERTAINTY ANALYSIS FOR THE ESTIMATED HYDRAULIC CONDUCTIVITY FROM THE REDUCED DURATION PUMPING TEST	348
<i>Ying Zhang, Chengpeng Lu, Rui Zeng, Liyong Jiang, Lei Wei</i>	
A NOVEL BP NEURAL NETWORK WITH WAVELET TRANSFORM INPUTS FOR AIR QUALITY INDEX PREDICTION	357
<i>Zheng Fang, Lei Zhang, Yakun Huang</i>	
FAHP ON THE DEVELOPMENT OF EXHIBITION ECOLOGICAL EDUCATION	364
<i>Lin Yang</i>	
DEVELOPMENT OF AN ANTI-CORROSION AND ANTI-POLLUTION STONE MATERIAL	372
<i>Yuning Lu, Xiang Lin, Pei Zhao, Yanhao Zhang, Enyao Li, Su Zhao</i>	
ECOLOGICAL TOXICITY OF TRICLOSAN (TCS): A REVIEW	378
<i>Xiaolu Xu, Deyong Zhang, Wuchun Zhang</i>	
DESIGN OF A NEW HIGH EFFICIENCY HEAT STORAGE SYSTEM FOR SMALL AND MEDIUM-SIZED PHOTOTHERMAL POWER STATIONS	382
<i>Yipu Wang, Bingzheng Wang</i>	
THE CO-PILOT POSITION OF VEHICLE NOISE QUALITY PREDICTION BASED ON SVM.....	390
<i>Xiaojuan Zhang</i>	
DEVELOPMENT MODEL AND ANALYSIS OF SINGLE WELL CIRCULATING SHALLOW GEOTHERMAL ENERGY BASED ON MATHEMATICAL MODELING	395
<i>Liwu Yu</i>	
REVIEW OF GIS TECHNOLOGY AND ITS APPLICATIONS IN DIFFERENT AREAS.....	404
<i>Ziye Liu, Liusan Cheng</i>	
EXPERIMENTAL STUDY ON THE DAMPING EFFECTS OF VARIOUS VIBRATION REDUCTION MEASURES.....	409
<i>Tanghai Liu, Rui Rao, Jianwu Liu, Mao Ye, Yue Huang</i>	
WET OXIDATION TREATMENT OF WASTE ACTIVATED SLUDGE OF A PHARMACEUTICAL FACTORY	418
<i>Pengfei Guo, Xu Zeng, Guodong Yao, Yangyuan Zhou, Jianfu Zhao</i>	

ENVIRONMENTAL SCIENCE AND ENGINEERING

DESIGN AND OPTIMIZATION OF THE COLLECTOR OF ELECTRIC SUGARCANE LEAVES RETURNING FIELD MACHINE.....	423
<i>Yisen Lin, Meng Yu, Fujun Wen, Zengxue Zhang, Yanqin Tang, Yuxing Wang</i>	
ANALYSIS OF REMOVAL FUNCTION RESULTS OF PERMANENT MAGNET POLISHING DEVICE TEST	435
<i>Xiaoqin Zhou, Baoquan Sun, Haocheng Wang, Hang Yu, Xiaoyang Wu</i>	
ABANDONMENT RESEARCH AND ENVIRONMENTAL IMPACT ANALYSIS FOR RETIRED DONG-HUANG PIPELINES.....	442
<i>Xuesong Zhang, Rangang Yu, Jinping Chen</i>	

EFFECT OF PEG ON POLYSULFONE SUPPORT AND REVERSE OSMOSIS MEMBRANE PROPERTY	450
<i>Jin Wang, Zhijie Zhang, Jiarui Li, Jiani Zhu, Xiaorong Meng, Xiaojun Li, Xudong Wang</i>	
PREPARATION OF NAOH MODIFIED SPENT GRAIN ADSORBENT AND ADSORPTIVE PROPERTIES FOR DYES	455
<i>Yawei Wang, Yaxin Lv, Haiqi Shen, Shenyang Xu, Yu Guo, Zhijie Bao, Yan Feng</i>	
QUENCHING PROCESS SIMULATION OF SPUR GEAR BASED ON ANSYS	465
<i>Jingdong Zhang, Kuan Yang, Shenglian Zhao, Bin Zheng</i>	
REFORM OF UNIVERSITY PHYSICS EXPERIMENT COURSE UNDER THE COMBINATION OF BIG DATA AND INDUSTRIAL INTERNET	471
<i>Chunjuan Han</i>	
CHARACTERISTICS OF THE VIOLENT TYPHOON EVENTS SERIOUSLY AFFECTING HAINAN ISLAND AND ITS RELATIONSHIP WITH PDO	477
<i>Jingjing Zhu, Xiaoping Zhao, Shengan Wu, Caiying Xing, Jing Yang</i>	
RESEARCH ON A NEW TYPE TOPOLOGY OF 4-QUADRANT CONVERTERS.....	483
<i>Dawei Pan</i>	
ANALYSIS AND EXPERIMENT OF FLOW FIELD IN SUGARCANE LEAF CUTTING AND RETURNING MACHINE	489
<i>Haiyan Dai, Yuxing Wang, Fujun Wen, Yanqin Tang</i>	
THE STUDY OF THERMAL ENVIRONMENT DURING THE MOVEMENT OF AIR- CONDITIONED TRAIN	501
<i>Hongmin Li</i>	
DRILLING FLUID LEAKAGE MODEL BASED ON THE DUAL-MEDIUM THEORY	512
<i>Jinjiang Liu, Wenlin Wu, Peng Qian, Shuo Wang</i>	
THE INFLUENCE OF PARTICLE SIZES AND INLET-OUTLET CONFIGURATION ON THE HYDRAULIC CHARACTERISTICS OF HORIZONTAL SUBSURFACE CONSTRUCTED WETLANDS	518
<i>Hua Zhong, Peng Li, Xuan Guo, Chengjun Zhang</i>	
STUDY ON THE THEORY OF HIGH PRESSURE WATER JET COAL BREAKING AND ITS MAIN CONTROLLING FACTORS	523
<i>Yongjiang Zhang</i>	

Author Index