

# **2021 International Conference on Electrical Materials and Power Equipment (ICEMPE 2021)**

**Chongqing, China  
11-15 April 2021**



**IEEE Catalog Number: CFP21J57-POD  
ISBN: 978-1-6654-3069-2**

**Copyright © 2021 by the Institute of Electrical and Electronics Engineers, Inc.  
All Rights Reserved**

*Copyright and Reprint Permissions:* Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

***\*\*\* This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP21J57-POD
ISBN (Print-On-Demand):	978-1-6654-3069-2
ISBN (Online):	978-1-6654-1840-9

**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  
E-mail: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

# TABLE OF CONTENTS

## INVITED PAPERS

THE GASSING OF INSULATING FLUIDS .....	1
<i>Issouf Fofana</i>	
STATISTICAL ANALYSIS OF AC BREAKDOWN VOLTAGE OF CELLULOSE PAPER ENHANCED WITH ARAMID IMMERSSED IN MINERAL OIL AND SYNTHETIC ESTER LIQUID .....	9
<i>Pawel Rozga, Filip Stuchala, Jaroslaw Drozd, Nemer Khazaal, Kamil Kazmierczak, Jakub Staniewski, Feipeng Wang, Zijia Shen, Jian Li</i>	

## ORAL

THZ SPECTROSCOPIC STUDY OF DEGRADATION OF EPOXY RESINS.....	13
<i>Yoshimichi Ohki, Hiroyuki Ishii, Mayu Hayashi, Naoshi Hirai</i>	
INFLUENCE OF OCTAVINYLS-POLYHEDRAL OLIGOMERIC SILSESQUOXANE ON THE ELECTRIC TREEING RESISTANCE OF POLYPROPYLENE .....	17
<i>Xiaosi Lin, Wah Hoon Siew, Martin Given, John Liggat, Jinliang He</i>	
RESEARCH ON SPACE CHARGE CHARACTERISTICS OF LDPE/MICROCAPSULE SELF- HEALING INSULATION MATERIAL.....	21
<i>Yunqi Li, Youyuan Wang, Yudong Li, Yanfang Zhang, Adnan Yaseen</i>	
ELECTRICAL TREE AGING CHARACTERISTICS OF SILICONE RUBBER FILLED WITH MONOMODAL PDMS-GRAFTED TiO <sub>2</sub> NANOPARTICLES UNDER POWER FREQUENCY VOLTAGE .....	25
<i>Yuanxiang Zhou, Quzong Gesang, Yunxiao Zhang, Linlu Liu, Ling Zhang</i>	
UNDERSTANDING THE THERMAL AND RESISTIVE PROPERTIES FROM THE PERSPECTIVE OF MOLECULAR INTERACTION OF EPOXY/POSS COMPOSITE .....	29
<i>Farooq Aslam, Zhen Li, Guanghao Qu, Zhaozi Zhang, Huan Niu, Shengtao Li</i>	
AGEING STATUS IDENTIFICATION OF OIL-PAPER IMPREGNATED INSULATION BY NIRS DETECTION WITH IMPROVED LDA METHOD .....	33
<i>Xiaolin Chen, Wenbo Zhang, Han Li, Lincong Chen, Chuanfu Fu, Yuan Li</i>	
HEAT-TRIGGERED SELF-HEALING CROSS-LINKED POLY(SILICONE-UREA)S WITH RECOVERABLE DIELECTRIC PERFORMANCES .....	37
<i>Wenjie Sun, Lei Zhang, Jiaming Luo, Jiale Mao, Yuanlong Xie, Yonghong Cheng</i>	
WHAT IS MECHANISM OF SPACE CHARGE ACCUMULATION IN POLYETHYLENE WITH SURFACE FLUORINATION? .....	41
<i>Jiaping Pan, Mingshu Lyu, Zhenlian An, Feihu Zheng, Yewen Zhang</i>	
STUDY ON THE ENERGY STORAGE PERFORMACE OF AL <sub>2</sub> O <sub>3</sub> /PVDF HYBRID FILM BASED ON SOL BLENDING DOPING STRATEGY .....	45
<i>Chen Chen, Qingguo Chi, Tiandong Zhang, Xuan Wang, Qingquan Lei</i>	

SCALABLE AND DURABLE SUPERHYDROPHOBIC RTV SILICONE RUBBER INSULATOR COATINGS VIA FLUOROSILANE-MODIFIED SILICA NANOPARTICLE INCORPORATION .....	49
<i>Zijia Shen, Feipeng Wang, Gang Wen, Jianpeng Ye</i>	
AGING STAGE DIAGNOSIS OF OIL-PAPER INSULATION EQUIPMENT USING RAMAN SPECTRUM BASED ON MULTIPLE SCREENING KNN ALGORITHMS.....	53
<i>Yongkuo Zhou, Weigen Chen, Dingkun Yang, Ruyue Zhang</i>	
A NEW METHOD FOR DETECTING TRACE METHANOL IN INSULATING OIL BASED ON TERAHERTZ SPECTROSCOPY .....	57
<i>Yuxin He, Lijun Yang, Jiajun Li, Li Cheng, Dong Ding, Ruijin Liao</i>	
MECHANISM OF GAS MOVEMENT AND CONVERGENCE IN OIL-IMMERSED TRANSFORMER .....	61
<i>Yucheng Zhang, Zhiguo Hao, Haitao Yang, Boyu Li, Shaoyong Yao, Ruihan Yin</i>	
THE INFLUENCE OF THERMAL AGING ON SPACE CHARGE DISTRIBUTION IN OIL- IMPREGNATED PAPER UNDER AC FIELD.....	65
<i>Guiyue Zhou, Yi Yin, Jiandong Wu, Lu Che</i>	
SIGNAL CALIBRATION FOR ELECTRIC FIELD MEASUREMENT BY THE THERMAL PULSE METHOD.....	69
<i>Zhang Yu, Zheng Feihu, Chen Shijie, Chen Guanwen, Zhang Yewen</i>	
AN IMPROVED METHOD TO EVALUATE THE SEVERITY OF DISCHARGES WITH DGA BASED ON THERMODYNAMICS .....	73
<i>Rui Guo, Jian Wang, Renying Liu, An Ping, Ruofan Xiao, Jingrui Wang</i>	
AC FLASHOVER PERFORMANCE AND INSULATION COORDINATION OF NOVEL LIGHTNING PROTECTION COMPOSITE INSULATOR .....	77
<i>Jiazheng Lu, Jianping Hu, Zhen Fang, Xinhan Qiao, Zhijin Zhang, Xingliang Jiang</i>	
DISTRIBUTION CHARACTERISTICS OF INSULATION INTERFACIAL DEFECTS IN HIGH VOLTAGE DIRECT CURRENT CABLES .....	81
<i>Jiru Wang, Lisheng Zhong, Xiaoyu Yang, Wei Zhao, Fei Li, Wenpeng Li, Jinghui Gao</i>	
STUDY ON THE ELECTROMAGNETIC THERMAL COUPLING ANALYSIS METHOD FOR VALVE SIDE BUSHING OF CONVERTER TRANSFORMER UNDER MULTI-FREQUENCY HARMONIC CURRENT.....	85
<i>Mu Lin, Kai Liu, Hao Tang, Yan Yang, Bo Gao, Guangning Wu</i>	
ELECTRICAL INSULATION PROPERTIES OF MATERIAL INTERFACES IN HVDC CABLE FACTORY JOINT .....	89
<i>Fanbo Meng, Ashish Paramane, Muhammad Awais, Zewei Zhou, Yuantao Zhao, Xiangrong Chen</i>	
INSULATION DELAMINATION DETECTION OF THREE-PHASE COMPOSITE STRUCTURE BASED ON TERAHERTZ TIME-DOMAIN SPECTRAL.....	93
<i>Binglei Cao, Shuaibing Li, Yongqiang Kang, Jingtao Lu, Xingzu Yang, Haiying Dong</i>	
A MODULAR OVER-VOLTAGE TRIGGER DEVICE FOR TWO-ELECTRODE SPARK-GAP SWITCHES .....	97
<i>Xuedi Liu, Zicheng Zhang, Huibo Zhang, Haoran Zhang, Shifei Liu, Longbo Yan</i>	

ASSESSMENT OF THE INSULATION CONDITIONS OF POWER TRANSFORMERS THROUGH ONLINE MONITORING OF PARTIAL DISCHARGES .....	100
<i>Guilherme M. F. Ferraz, Laerty J. S. Damião, Renato M. Capelini, Rogério Salustiano</i>	
FAILURE ANALYSIS OF HVDC CABLE ACCESSORIES DURING R&D TESTS .....	105
<i>Yi Luo, Mingyu Zhou, Tobias Fechner, Haitian Wang</i>	
EFFECT OF NANO-DOPING ON THE INTERFACE CHARGE CHARACTERISTICS OF SIR/XLPE COMPOSITE INSULATION .....	109
<i>Chunmiao Ma, Yunxiao Zhang, Yuanxiang Zhou, Ling Zhang, Xin Huang</i>	
COMPARISON OF OPTIMIZATION METHODS USED IN THE DESIGN OF FUNCTIONALLY GRADED INSULATION OBJECTS .....	113
<i>Haoyang Yin, Wendong Li, Chao Wang, Zhihui Jiang, Wang Guo, Guanjun Zhang</i>	
THE EFFECT OF EPOXIDE ON MOLECULAR CHAIN RELAXATION ON BISPHENOL A EPOXY RESIN AFTER CURING .....	117
<i>Mingru Li, Zhuoli Cai, Huan Niu, Shengtao Li, Yafang Gao, Bingnan Li, Hangyin Mao, Weiwang Wang, Kai Shang</i>	
GAMMA-RAY IRRADIATION INDUCED VARIATION IN THERMAL CONDUCTIVITY OF POLYETHYLENE/NANO-SILICA/MICRO-BORON NITRIDE COMPOSITE AS POTENTIAL CABLE INSULATION .....	121
<i>Binyuan Ye, Yong Liu, Yu Gao, Jing Li, Bangbang Xu, Boxue Du</i>	
GLASS TRANSITION OF LDPE AND PP UNDER HIGH QUASI-HYDROSTATIC PRESSURE IN ROOM TEMPERATURE .....	125
<i>Chaohu Yu, Yewen Zhang, Jingxian Xu, Yabo Sun, Zhi Li, Yang Xu, Xuan Wang, Longhua Mu, Qingquan Lei</i>	
SIGNIFICANTLY IMPROVED BREAKDOWN STRENGTH OF SANDWICHED POLYMER DIELECTRICS BY FUNCTIONALIZED BORON NITRIDE NANOSHEETS .....	128
<i>Yingke Zhu, Pingkai Jiang, Xingyi Huang</i>	
ELECTRICAL CHARACTERISTICS OF POLYIMIDE FILM MODIFIED BY NANOPARTICLE IN LN .....	132
<i>Daosheng Liu, Liang Zhang, Xingrong Chen, Chunhua Zhou</i>	
ENHANCE THE SURFACE FLASHOVER PERFORMANCE OF THE FLUOROCARBON COATING COMPOSITED WITH SIC PARTICLES .....	136
<i>Wenjie Xu, Jian Li, Zhengyong Huang, Feipeng Wang, Jianying Zhao, Fanyun Su</i>	
AMINIATURIZED DEVICE FOR DETECTING DEFECTS OF PORCELAIN INSULATORS BASED ON HIGH-LEVEL IMPULSE VOLTAGE BREAKDOWN .....	140
<i>Lu Wen, Junshuang Zhang, Liming Wang, Fanghui Yin</i>	
RESEARCH AND APPLICATION OF INTELLIGENT DIAGNOSIS METHOD OF MECHANICAL FAULT BASED ON TRANSFORMER VIBRATION AND NOISE AND BP NEURAL NETWORK .....	144
<i>Zhangting Yu, Dajian Li, Liangyuan Chen</i>	
INFLUENCE OF INSULATION MATERIAL PARAMETERS OF LARGE HYDRO-GENERATOR ON ELECTRIC FIELD DISTRIBUTION AND POTENTIAL DISTRIBUTION AT THE END OF STATOR BAR .....	148
<i>Ze Huang, Keer Sun, Bo Hu, Yulai Zhao, Mingpeng He, Jianlin Hu, Xingliang Jiang</i>	

AGEING EVALUATION OF THE DISTRIBUTION TRANSFORMER UNDER VARYING LOAD DUE TO ELECTRIC VEHICLE CHARGING .....	152
<i>Sen Qian, Xiaojing Zhang, Chuan Chen, Hongkang Wang, Jinghong Guo, Yang Xu</i>	
INFLUENCE OF FIBER DIAMETERS ON THE THERMAL CONDUCTIVITY OF LIQUID CRYSTAL EPOXY RESIN FILM.....	156
<i>Senyuan Yang, Zhengyong Huang</i>	
THERMAL STRESS ANALYSIS OF EPOXY RESIN ENCAPSULATED SOLID STATE TRANSFORMER'S CRACKING CAUSED BY TEMPERATURE SHOCK .....	160
<i>Yixian Dai, Yushun Zhao, Wei Yang, Yun Chen, Long Wei</i>	
RESEARCH ON ELECTRIC FIELD DISTRIBUTION AT WINDING END OF CONVERTER TRANSFORMER CONSIDERING TEMPERATURE GRADIENT .....	164
<i>Liangkai Wang, Kaining Hou, Xinbo Lu, Qingquan Li</i>	
FDS PREDICTION OF TRANSFORMER OIL-PAPER INSULATION UNDER NON-UNIFORM AGING BASED ON FINITE ELEMENT METHOD .....	168
<i>Xianhao Fan, Tengyue Sun, Jiefeng Liu, Yiyi Zhang</i>	
CALCULATION OF EXCITATION CURRENT AND LOSS OF 110KV THREE-PHASE TRANSFORMER UNDER DC BIAS .....	172
<i>Peng Li, Mingxin Dong, Gang Li, Shuqi Zhang, Ke Wang, Jinzhong Li</i>	
IDENTIFICATION STRUCTURAL AND MOISTURE DEFECT OF OIL - PAPER INSULATION BUSHING BASED ON PARTIAL DISCHARGE PHASE AND DISCHARGE QUANTITY ANALYSIS.....	176
<i>Yu Shang, Xiaowei Liu, Qiang Liu, Yong Liang, Zheng Jian, Jian Hao</i>	
FAULT ANALYSIS AND ELECTRIC FIELD SIMULATION OF ELBOW CABLE TERMINAL IN DISTRIBUTION NETWORK .....	180
<i>Deng Zhixiang, Pan Jianbing, Yan Nianping, Hao Yu, Qi Qinya, Chen Gege, Chen Zhen, Huang Yangqi</i>	
AN ANALYSIS OF THE CHARACTERISTICS OF OIL-PAPER INSULATED BUSHING WITH MOISTURE AND X-WAX DEFECTS THROUGH OIL CHROMATOGRAPHIC AND FREQUENCY DOMAIN SPECTROSCOPY .....	184
<i>Yubo Zhang, Zhiming Huang, Ran Zhuo, Mingli Fu, Zhangting Yu, Lei Zhang, Yan Luo, Yue Yu</i>	

## **POSTER**

CHARACTERISTICS OF CHARGE DISSIPATION ON SUPER-HYDROPHOBIC SURFACE OF SILICONE RUBBER AND ITS INFLUENCE ON HYDROPHOBICITY .....	188
<i>Qian Wang, Hao Shen, Xidong Liang, Tingyu Jiang, Shuming Liu, Zhou Zuo</i>	
NANO-CELLULOSE DOPING TO IMPROVE THE ELECTRICAL PROPERTIES OF INSULATING PAPER UNDER THERMAL AGING.....	192
<i>Boxue Du, Wuye Tao, Jinpeng Jiang</i>	
A HIGH-THROUGHPUT PLASMA-BASED APPROACH FOR IMPROVING THE THERMAL CONDUCTIVITY OF EPOXY RESIN/BORON NITRIDE .....	196
<i>Penghao Zhang, Liang Yu, Wenjie Sun, Dazhao He, Shoulong Dong, Chenguo Yao</i>	

EXPERIMENTAL STUDIES ON INSULATION AND ARC EXTINGUISHING PERFORMANCE OF C <sub>5</sub> F <sub>10</sub> O/CO <sub>2</sub> GAS MIXTURE .....	200
<i>Xiaonan Wang, Zhe Ye, Dingxin Liu, Jialin Liu, Huan Yuan, Aijun Yang, Mingzhe Rong, Xiaohua Wang</i>	
IMPROVEMENT OF INTERFACIAL WETTING AND MECHANICAL ELECTRICAL PROPERTIES OF CU-B/ SINTERED-CARBON COMPOSITES .....	204
<i>Haozi Zuo, Guangning Wu, Xiaobo Li, Zhanglin Huang, Wenfu Wei, Zefeng Yang</i>	
EFFECTS OF BENZENE RING AND POLAR GROUP ON THE CONDUCTIVITY CHARACTERISTICS OF POLYETHYLENE MATRIX COMPOSITES .....	208
<i>Zhiqiang Wang, Zhonghua Li, Cheng Peng</i>	
THE IMPROVEMENT OF FLASHOVER CHARACTERISTICS WITH FIELD GRADING CCTO COATING FOR GIL SPACER .....	212
<i>Yufan Wang, Jin Li, Mi Xiao, Hucheng Liang, Hang Yao, Boxue Du</i>	
EFFECTS OF VOLTAGE STABILIZERS ON THE AC AND DC BREAKDOWN STRENGTHS OF EPDM .....	216
<i>Wei Hu, Chunyang Li, Hong Zhao, Zhenguo Yue, Shuai Hou, Mingli Fu</i>	
MICROSCALE CHARACTERISTIC OF CHALKING SILICONE RUBBER .....	220
<i>Yonghao Fang, Yu Deng, Yijun Du, Songsong Zhou, Chen Gu, Jun Zhou</i>	
STUDY OF STORAGE ACTIVITY OF XLPE PRE-CROSSLINKED MATERIAL FOR HIGH VOLTAGE AC CABLES .....	225
<i>Yizhu Wang, Xia Wang, Xunzhi Ye, Shuai Hou, Meibing Liu, Mingli Fu</i>	
A NOVEL SURFACE CHARGE ACCUMULATION BEHAVIOR ON DOWNSIZED SPACERS IN C <sub>4</sub> F <sub>7</sub> N/CO <sub>2</sub> MIXTURE .....	229
<i>Junhao Dong, Junhong Chen, Jinshu Li, Junbo Deng, Yan Liu, Jianben Liu</i>	
BREAKDOWN IMPROVEMENT OF PP FILMS UNDER DC SUPERCOMPOSED HARMONIC VOLTAGES .....	233
<i>Z. Y. Ran, B. X. Du, M. Xiao, H. L. Liu, J. W. Xing</i>	
ADDITIVE MANUFACTURING OF POLYMER-MATRIX COMPOSITE DIELECTRIC MATERIALS USING STEREOLITHOGRAPHY TECHNIQUE .....	237
<i>Wen-Dong Li, Chao Wang, Hao-Yang Yin, Jun-Bo Deng, Hai-Bao Mu, Guan-Jun Zhang, Yun Chen, Fa-Lun Song, Yan-Ling Chen</i>	
HYDROPHOBICITY IMPROVEMENT OF POLLUTED SILICONE RUBBER BY PLASMA JET IN HIGH HUMIDITY ENVIRONMENT .....	241
<i>Shuang Li, Jianjun Li, Ruobing Zhang</i>	
STUDY ON EPOXY RESIN CURING PROCESS BASED ON FREQUENCY DIELECTRIC SPECTROSCOPY .....	245
<i>Yinjun Shi, Yushun Zhao, Wei Yang, Xin Chen, Yun Chen</i>	
STUDY ON REAL-TIME TEMPERATURE DISTRIBUTION CHARACTERISTICS OF THE HTS TAPE UNDER SHOCK CURRENT .....	249
<i>Jianfa Wu, Yaxiong Tan, Chuyu Tian, Jian Li</i>	
EXPANDING THE PROCESS WINDOW OF EPOXY COMPOSITE INSULATING MATERIALS BY COMPOUNDING ANHYDRIDE .....	253
<i>Zimin Luo, Yushun Zhao, Cheng Yan, Song Zhang, Wei Yang, Yu He</i>	

STUDY ON CORROSION RESISTANCE OF GRAIN BOUNDARY ENGINEERING WINDINGS AT DIFFERENT TEMPERATURES .....	257
<i>Yuan Yuan, Zhou Jiang, Jiang Youdong, Kuang Xiongwei, Gao Xue</i>	
PREPARATION AND ELECTRICAL PROPERTY OF CARBON FOAM GROUNDING MATERIAL BY PYROLYSIS OF CYANATE ESTERS MODIFIED WITH PHOSPHORUS CONTAINED SCHIFF-BASE.....	261
<i>Mian Fan, Hui-Wen He, Bo Tan, Xiang-Han Wang, Xue-Fang Tong, Min Dai</i>	
RESEARCH ON IMPROVEMENT OF CARBON FIBER COMPOSITE HEATING ELEMENT .....	265
<i>Lihua Jiang, Jianlin Hu, Keer Sun, Xiaofeng Wang, Ruihe Zhang</i>	
THE EFFECT OF POWDERED LAYER ON THE PHYSICOCHEMICAL PROPERTIES OF SILICONE RUBBER SURFACE .....	270
<i>Huan Huang, Tian Liang, Xiaohong Ma, Jianrong Wu, Qi Yang, Ying Zhang, Bo Li</i>	
STUDY ON CORROSION FAILURE CHARACTERISTICS OF SILICONE RUBBER IN ACIDIC ENVIRONMENT .....	274
<i>Xiaodan Ma, Zhijin Zhang, Xiaohong Ma, Huan Huang, Xingliang Jiang</i>	
THE INFLUENCE OF SINTERING TEMPERATURE ON PHASE COMPOSITION AND AC BREAKDOWN FIELD STRENGTH OF $\text{SrTiO}_3\text{-PbTiO}_3\text{-Bi}_2\text{O}_3\text{-Nb}_2\text{O}_5$ HIGH-VOLTAGE CERAMICS.....	278
<i>Yiwen Qiu, Wei Chen, Jingen Sun, Baoying Dong</i>	
EFFECT OF SECONDARY DRYING IMPREGNATION ON THE BREAKDOWN CHARACTERISTICS OF OIL-PAPER .....	282
<i>Pengfei Xu, Lijun Yang, Huanchao Cheng</i>	
ANALYSIS OF INFRARED CHARACTERISTICS OF $\text{SO}_2\text{F}_2$ AND $\text{SO}_2$ OF $\text{SF}_6$ DECOMPOSITION COMPONENTS.....	286
<i>Chao Bian, Feng Dai, Jun Cheng, Qiang Gan, Zhengdong Zhang, Guanglu Cui, Tingyue Tan, Dongfeng Li, Jiangang Xie</i>	
FABRICATION OF FABRAY-PEROT SENSOR BASED ON STAINLESS STEEL DIAPHRAGM AND ITS SENSING CHARACTERISTICS OF PARTIAL DISCHARGE ULTRASOUND .....	290
<i>Mengying Chen, Zhixian Zhang, Jiali Lei, Yuxuan Song, Kejie Wu</i>	
EFFECT OF NEGATIVELY CHARGED $\text{SiO}_2\text{-PMMA}$ FILLER ON PROPERTIES OF EPOXY RESIN COMPOSITES.....	296
<i>Yuxiang Mai, Bin Du, Qian Liu, Yu Shi</i>	
STUDY ON INSULATION PERFORMANCE OF THERMAL AGING XLPE CABLES BY DIRECT CURRENT INTEGRATED CHARGE TECHNIQUE.....	300
<i>Bingrong Huang, Weiwang Wang, Shengtao Li, Xinyuan Li, Yongjie Nie, Yunkun Deng, Qihang Jiang</i>	
STUDY ON THE DECREASE OF POWER LOSS DURING DC DEGRADATION OF ZINC OXIDE VARISTOR CERAMICS .....	304
<i>Zongke Hou, Yingying Zheng, Men Guo, Yao Wang, Zhuolin Cheng, Kangning Wu, Jianying Li, Shengtao Li</i>	
OIL FLOW ELECTRIFICATION OF INSULATING OIL DETECTED BY THE TRIBOELECTRIC EFFECT.....	308
<i>Jiachen Yao, Zhengyong Huang, Jian Li, Xiaoqiang Xiao, Qiang Xu</i>	



ANALYSIS OF BREAKDOWN CHARACTERISTICS OF SENSING OPTICAL FIBER IN OIL UNDER AC AND DC VOLTAGE CONDITIONS.....	312
<i>Zhenhui Luo, Quan Zhou, Xi Ouyang, Jiajia Zheng, Junfeng Dai, Hujun Shang</i>	
ENHANCED THERMOELECTRIC PERFORMANCE OF $Bi_2Te_3$ THROUGH UNIFORM DISPERSION OF $Ti_3C_2Tx$ .....	316
<i>Jianying Zhao, Zhengyong Huang, Jian Li, Feipeng Wang, Huijun Liao, Wenjie Xu</i>	
A HIGH EFFICIENT TIME-DOMAIN MODELING METHOD FOR PARTIAL DISCHARGE PROPAGATION IN XLPE CABLES WITH LARGE LENGTH .....	320
<i>Saike Yang, Li Wang, Xianyu Yue, Hongjie Li</i>	
OPTIMIZATION OF POWER FREQUENCY WITHSTAND VOLTAGE CHARACTERISTICS OF THERMAL ELECTROCHEMICAL OXIDE CERAMIC FILM BASED ON MACHINE LEARNING.....	324
<i>Zhen Yan, Haomin Li, Meng Zhang, Lianke Wang, Yingsan Geng, Jianhua Wang</i>	
RESEARCH ON MOA CONFIGURATION IN UHV AC SUBSTATION LOCATED IN MORE THUNDERSTORM REGION AND THUNDERSTORM ACTIVITY SPECIAL STRONG REGION .....	328
<i>Xiujuan Chen, Zhaohui Zhang, Weidong Shi, Fengbo Tao, Tiantian Lu, Liuchun Zhang, Ting Lei, Chengbo Hu, Yongling Lu</i>	
DESIGN AND IMPLEMENTATION OF IMAGE RECOGNITION FOR PACKAGE CRACK OF DRY-TYPE AIR-CORE REACTOR PACKAGE .....	332
<i>Anlan Mao, Huihao Guo, Ye Fei, Haidan Lin, Jin Qiu</i>	
MEASUREMENT OF RESIDUAL STRESS IN GIS BASIN INSULATORS BY USING ULTRASONIC LONGITUDINAL CRITICALLY REFRACTED WAVE METHOD .....	336
<i>Xu Yang, Changhong Zhang, Weiguo Li, Chao Gao, Fusheng Zhou, Ruodong Huang, Guoli Wang, Xuezhi Liang</i>	
DIAGNOSIS OF OVERALL 10KV CABLE INSULATION STATE BASED ON TRANSIENT VOLTAGE TRANSFER CHARACTERISTICS.....	340
<i>Qingsong Jie, Qing Yang, Yu Zhang, Haonan Cui</i>	
FABRICATION OF DURABLE SUPERHYDROPHOBIC ALUMINIUM SURFACE AND ITS ANTI-ICING PROPERTIES.....	345
<i>Guoyong Liu, Yuan Yuan, Ruijin Liao, Qi Yu, Liang Wang</i>	
IMPROVED DIELECTRIC PROPERTIES OF POLYPROPYLENE FILMS BASED ON AROMATIC COMPOUNDS.....	349
<i>Boxue Du, Jiwen Xing, Meng Xiao, Zhaoyu Ran, Haoliang Liu, Jianan Dong</i>	
EFFECTS OF FULLERENE C60 ON THE DIELECTRIC STRENGTH OF EPOXY RESIN AT ELEVATED TEMPERATURE .....	353
<i>Boxue Du, Yifang Wang, Xiaoxiao Kong, Hanlei Sun, Jin Li, Wenbo Zhu</i>	
DC BREAKDOWN STRENGTH OF ZNO/GFRP AT ROOM TEMPERATURE AND CRYOGENIC TEMPERATURE.....	357
<i>Peng Jia, Rongjin Huang, Dong Xu, Yongguang Wang, Zhicong Miao, Laifeng Li</i>	
FEASIBILITY ANALYSIS OF HEXAPHENOXY CYCLOTRIPHOSPHAZENE FLAME RETARDANT FOR INHIBITING ELECTRICAL TREE GROWTH OF EPOXY RESIN .....	361
<i>Yongguang Wang, Rongjin Huang, Peng Jia, Zhicong Miao, Hongyu Dong, Laifeng Li</i>	

ELECTRICAL TREE CHARACTERISTICS IN GRAPHENE/SIR NANOCOMPOSITES UNDER TEMPERATURE GRADIENT .....	365
<i>Yimeng Li, Boxue Du, Jin Li, Zhonglei Li, Tao Han, Zhaoyu Ran</i>	
RESEARCH ON HIGH VOLTAGE CAPACITOR PARTIAL DISCHARGE DETECTION WITH PORTABLE OSCILLATING WAVE CIRCUIT .....	369
<i>Lingying Chen, Guangke Xu, Panfeng Shang</i>	
INFLUENCE OF OIL BAFFLE STRUCTURE ON WINDING TEMPERATURE DISTRIBUTION OF TRANSFORMER UNDER DIFFERENT COOLING MODES .....	373
<i>Cong Liu, Jian Hao, Xianliang Zhang, Jiang Sun, Chun Xiang, Guanghua Liao</i>	
STUDY ON TERAHERTZ TIME-DOMAIN SPECTROSCOPY METHOD OF DETECTING INORGANIC SALT IN OUTDOOR INSULATION CONTAMINATION .....	377
<i>Xudong Zheng, Hongwei Mei, Xingming Bian, Lanxin Li, Huaiyuan Jiang, Liming Wang</i>	
ELECTRIC FIELD COMPUTATION AND OPTIMIZATION FOR A 400 KV Y-SHAPED COMPOSITE CROSS-ARM .....	381
<i>Kai Yin, Filipe Faria Da Silva, Claus Leth Bak, Hanchi Zhang, Qian Wang, Henrik Skouboe</i>	
AN IMPROVED MESHLESS METHOD BASED ON STRONG-WEAK COUPLING ALGORITHM FOR ELECTRIC FIELD CALCULATION .....	385
<i>Hongzhi Du, Tong Wu, Yuan Fang, Shi Long, Youyuan Wang</i>	
IMPROVED FINITE ELEMENT BASED ON GRADIENT RECOVERY ALGORITHM FOR ELECTRIC FIELD CALCULATION .....	389
<i>Caiqi Tu, Yao Bai, Shi Long, Hongzhi Du</i>	
A METHOD FOR SIMULATING ABNORMAL HEATING INTERNAL INTERFACE OF COMPOSITE INSULATOR BASED ON ELECTROMAGNETIC HEATING.....	393
<i>Ziyue Li, Chao Gao, Ming Lu, Hongwei Mei, Yansong Wu, Liming Wang</i>	
NUMERICAL SIMULATION OF INFLUENCE OF DUST ON ELECTRIC FIELD DISTRIBUTION OF INSULATORS IN NORTHWEST CHINA .....	397
<i>Jiang Guimin, Zhou Yuanxiang, Sui Jiang Yuan, Ma Xudong, Jiang Ling, Wang Shengfu</i>	
TRAVELING WAVE LOCATION OF CABLE FAULTS BASED ON REAL-TIME SENSING OF HIGH FREQUENCY SIGNALS .....	401
<i>Muye Zhang, Renfei Che, Jiahui Chen</i>	
RESEARCH ON POSITION AND RECOGNITION ALGORITHMS FOR INSULATORS BASED ON EFFICIENTDET.....	405
<i>Qifan Yang, Zhicheng Ma, Zhiru Li, Xu Zhang, Fangjun Li, Hongzhong Ma, Shaotong Pei</i>	
INTERFACE STRESS SIMULATION OF 200KV GAS-FILLED PLUG-IN DC CABLE TERMINATION .....	409
<i>Haitian Wang, Yi Luo, Tobias Fechner, Chong Zhang, Zhengtong Lu, Mingyu Zhou</i>	
SURFACE ELECTRIC FIELD SIMULATION OF WORKER IN LIVE WORKING ON $\pm 800$ KV UHVDC TRANSMISSION LINE .....	413
<i>Chilong Jiang, Dehua Zou, Xiao Yang, Qiaoqing He, Tianyan Jiang</i>	
NOISE ANALYSIS AND DEVICE IMPROVEMENT OF COMPOSITE PROBE FOR SPACE CHARGE MEASURING BASED ON PIPWP METHOD.....	417
<i>Kong Jiaying, Zhang Yewen, Zebin Cao, Zheng Feihu, Ting Qian</i>	

ELECTRIC FIELD SIMULATION OF 10KV CABLE INTERMEDIATE JOINT BASED ON INGRESS DEFECT .....	420
<i>Chenyang Zhang, Zhidong Jia</i>	
TRANSFORMER DEFECTS DETECTION METHOD BASED ON VISIBLE AND INFRARED FUSION IMAGES .....	424
<i>Yifeng Han, Yan Dai, Li Liu, Donglian Qi, Rui Han, Xiongwei Jiang</i>	
TWO METHODS OF SIMULATING CORONA CURRENT PULSES IN SF <sub>6</sub> UNDER NEGATIVE DC VOLTAGE.....	428
<i>Wei Ding, Yanliang He, Anbang Sun, Guanjun Zhang</i>	
SIMULATION OF ELECTRIC FIELD AND POTENTIAL TRANSFER ARC DURING THE ON-LINE PROCESS OF THE LIVE WORKING ANTI-VIBRATION HAMMER ROBOT.....	432
<i>Chi Yu, Weiwei Pan, Xinglie Lei, Guangkai Yu, Weinan Qin, Kai Zhu, Hongwei Zheng</i>	
ANALYSIS ON THE FLUX LEAKAGE DISTRIBUTION BY THE 3D FEM SIMULATION METHOD UNDER THE DIFFERENT LOCAL AND MINOR TRANSFORMER WINDING DEFECTS.....	436
<i>Xi Ouyang, Quan Zhou, Weigen Chen, Lin Du, Hujun Shang, Junfeng Dai</i>	
RAMAN DIAGNOSIS METHOD FOR THERMAL AGING OF INSULATING PAPER BASED ON AE-LDA AND NAIVE BAYES .....	440
<i>Zewei Wang, Weigen Chen, Fu Wan, Dingkun Yang, Weiran Zhou</i>	
RESEARCH ON LIGHTNING MULTI-CHARACTERISTIC QUANTITY MONITORING SYSTEM FOR TRANSMISSION LINES.....	444
<i>Kaihua Jiang, Xiangxian Zhou, Yongtao Jin, Lin Du, Wenhao Wang, Rui Han</i>	
CALCULATION AND ANALYSIS OF INDUCED CURRENT OF OPEN CIRCUIT BREAKER IN 500KV SUBSTATION .....	448
<i>Yang Su, Gang Liu, Xiaoming Zhang, Song Yan, Kai Ma, Daojun Huang, Yushun Zhao</i>	
A NEW METHOD OF NUCLEAR MAGNETIC RESONANCE FOR AGING STATE DETECTION OF COMPOSITE INSULATORS .....	452
<i>Zhangting Yu, Dajian Li, Liangyuan Chen</i>	
RESEARCH ON CABLE DEFECT LOCATION METHOD BASED ON JOINT TIME-FREQUENCY ANALYSIS .....	456
<i>Bin Feng, Lin Zhang, Shuai Hou, Xiaojing Dang, Wenbo Zhu, Baojun Hui, Mingli Fu</i>	
THE DIAGNOSIS OF METAL VAPOR DENSITY AFTER ARC EXTINCTION BY PLANE LASER-INDUCED FLUORESCENCE .....	460
<i>Shaogui Ai, Yiping Fan, Yuecheng Li, Yujie Gong, Pei Ding, Feiyue Ma, Xiuguang Li, Zhenxing Wang</i>	
STUDY ON THE TANGENT CALCULATION METHOD OF FREQUENCY-DOMAIN DIELECTRIC LOSS ANGLE BASED ON IMPROVED KALMAN FILTERING ALGORITHM .....	464
<i>Zhiming Huang, Ran Zhuo, Mingli Fu, Yue Yu, Yan Luo, Chuanhui Cheng, Changting Yu, Hongsheng Zhan, Tao Yang, Jia Mao</i>	
TOPOLOGY OPTIMIZATION OF SPATIAL DISTRIBUTION OF DIELECTRIC PROPERTIES IN FUNCTIONALLY GRADED CABLE JOINT INSULATION .....	470
<i>Yifan Zhang, Bing Luo, Yongjie Nie, Mingli Fu, Shuai Hou, Baojun Hui, Bing Feng, Wenbo Zhu, Xianping Zhao, Xiangyu Tan</i>	

SIMULATION OF ELECTRICAL PERFORMANCE OF ALGAE CONTAMINATED SILICONE RUBBER.....	474
<i>Shifang Yang, Yunpeng Liu, Lei Sun</i>	
RESEARCH AND APPLICATION OF FAULT CURRENT CONTROL METHODS FOR ARTIFICIAL DC SHORT-CIRCUIT TEST.....	478
<i>Luo Pan-Dian, Xiao Lei-Shi, Sheng Chao, Zhu Liang-He</i>	
GEARBOX FAULT DIAGNOSIS FOR WIND TURBINES BASED ON DATA AUGMENTATION USING IMPROVED GENERATIVE ADVERSARIAL NETWORKS.....	482
<i>Chen Shen, Jingang Wang, Junsheng Chen, Bin Zhang</i>	
NUMERICAL ANALYSIS OF THE MOTION CHARACTERISTICS OF COMBUSTION PARTICLES IN GAP BASED ON MULTI-PHYSICAL FIELD COUPLING .....	486
<i>Changjie Zhou, Dongping Xiao, Yang Bao</i>	
APPLICATION OF AN IMPROVED ULTRAVIOLET SPECTROPHOTOMETRY TECHNOLOGY FOR THE DETERMINATION OF ANTIOXIDANTS IN NATURAL ESTER LIQUIDS.....	490
<i>Wei Peng, Mingxiang Xiong, Xianqin Deng, Zhiyan Peng, Wu Lu, Wenbin Zhao</i>	
VISUAL PLATFORMS FOR ULTRASONIC DETECTION OF THE STRESS IN GIS/GIL INSULATORS .....	494
<i>Weiguo Li, Jinwei Chu, Wanying Liu, Fusheng Zhou, Chao Gao, Ruodong Huang, Yingying Zhang</i>	
METHOD FOR DETECTION THE NON-SOLUBLE DEPOSIT DENSITY OF INSULATORS BASED ON HYPERSPECTRAL TECHNOLOGY .....	498
<i>Tingting Wang, Chengfeng Yin, Bing Luo, Yujun Guo, Xueqing Zhang</i>	
INTEGRATED DECISION-MAKING FOR LINE LOSS ONLINE CALCULATION AND MANAGEMENT BASED ON SITUATION AWARENESS VISUALIZATION .....	502
<i>Li Yao, Linna Ni, Huanlei Yu, Qi Ding, Jianmin Zhang, Jiangming Zhang, An Wen</i>	
RESEARCH ON THE DEFECT DETECTION TECHNOLOGY OF ABNORMAL VIBRATION OF GIS EQUIPMENT BASED ON ACOUSTIC EMISSION ANALYSIS TECHNOLOGY .....	508
<i>Xiping Jiang, Yingkai Long, Yongfu Li</i>	
IDENTIFICATION OF ICING THICKNESS BASED ON THE ON-LINE MONITORING OF INSULATORS .....	512
<i>Qiran Li, Yong Liu, Masoud Farzaneh, B. X. Du</i>	
MOLECULAR DYNAMICS SIMULATION OF WATER DIFFUSION IN LIQUID SILICONE RUBBER.....	516
<i>Zhanglei Shi, Zhidong Jia</i>	
RESEARCH ON THE METHODS OF MEASURING HIGH FREQUENCY SMALL CURRENT IN LARGE POWER FREQUENCY CURRENT BY CURRENT TRANSFORMER.....	520
<i>Tonghao Zhou, Jiangyu Liu, Zhe Zhuang, Jianguang Dai, Dehua Zhao, Feng Hou, Shengchang Ji</i>	
INTELLIGENT ONLINE MONITORING AND DIAGNOSIS OF A DC SUPERCONDUCTING CURRENT LIMITERS .....	524
<i>Yingdun Hei, Xingmei Zhou, Yaxiong Tan, Jiajun Pan, Wei Chen, Chuyu Tian</i>	

LOW-K CROSS-LINKED POLYIMIDE FOR MICROELECTRONIC PACKAGING APPLICATION.....	528
<i>Xiaodi Dong, Ming-Sheng Zheng, Jun-Wei Zha</i>	
CALCULATION OF ELECTRIC FIELD AND CONFIGURATION OF GRADING RING FOR COMPOSITE TOWER OF 500 KV AC DOUBLE CIRCUIT TRANSMISSION LINES .....	532
<i>Yezhi Wu, Xi Yang, Li Yang, Lijuan Zhu</i>	
DYNAMIC SIMULATION AND ANALYSIS OF CARBON FIBER CONDUCTOR GALLOPING .....	536
<i>Dannan Zheng, Weizhuo Chen, Yifeng Ju, Yinkun Chen, Yongli Liao, Bo Gong, Jinqiang He</i>	
OPTIMAL DESIGN OF MAGNETIC FIELD SENSOR FOR CONDITION MONITORING OF HIGH VOLTAGE POWER CABLE .....	540
<i>Xingwang Huang, Yong Liu, Qiran Li, B. X. Du</i>	
GALLOPING CHARACTERISTICS OF 10KV OVERHEAD TRANSMISSION LINE USING FINITE ELEMENT ANALYSIS METHOD .....	544
<i>Zhihui Wang, Yong Liu, Xianghuan Kong, Qiran Li, Xingwang Huang, B. X. Du</i>	
ANALYSIS OF MULTI-SPECTRAL SIGNAL IN GIS AND COMPARING WITH ELECTRICAL SIGNALS.....	548
<i>Nannan Yan, Huangru Zhu, Chengchen Qian, Shunsheng Gui, Chunjie Gu</i>	
DEFECTS ANALYSIS OF 550KV OIP TRANSFORMER BUSHING.....	552
<i>Kejie Huang, Jianwei Cheng, Shuaibing Wang, Wei Zhang, Linjie Zhao, Shan Wang</i>	
ELECTRO-MECHANICAL PERFORMANCE IMPROVEMENT OF PANTOGRAPH STRIP FOR HIGH-SPEED RAILWAY .....	556
<i>Wenfu Wei, Xiaobo Li, Qianhua Liao, Haozi Zuo, Zefeng Yang, Guangning Wu</i>	
RESEARCH ON A TRANSITION CIRCUIT OF VACUUM ON-LOAD TAP-CHANGER.....	560
<i>Geqi Li, Ke Wang, Shuqi Zhang, Fan Yang, Peng Li, Jinzhong Li, Gang Li, Xueli Liu</i>	
STUDY ON SURFACE ELECTRIC FIELD DISTRIBUTION CHARACTERISTICS OF POLLUTED COMPOSITE INSULATOR FOR $\pm 800$ KV TRANSMISSION LINE .....	567
<i>Chilong Jiang, Dehua Zou, Xiao Yang, Yuan Yang, Tianyan Jiang</i>	
RESEARCH ON TECHNICAL PARAMETERS OF SAFE OPERATION AND MAINTENANCE ON 110KV SHARED TOWERS .....	571
<i>Jianye Cui, Kai Zhu, Chunjun Tang, Zhun Zhang, Qiang Zhu, An Chen</i>	
STRUCTURE DESIGN OF UHVDC PURE SF <sub>6</sub> INSULATED BUSHING .....	575
<i>Gengsheng Xie, Yunfei Shi, Shifeng Shi, Qingyu Wang, Peng Liu, Zongren Peng</i>	
ANALYSIS OF THE INFLUENCE OF THE STRUCTURE OF THE ARC CHAMBER OF THE HIGH VOLTAGE SF <sub>6</sub> CIRCUIT BREAKER ON THE BREAKING CHARACTERISTICS OF THE CAPACITOR BANK .....	579
<i>Wenlong Yi, Yisong Zhao, Feiming Wang, Bing Li, Shanshan Zhang</i>	
THE INFLUENCE OF TEMPERATURE ON DRAW ROD SYSTEM OF CONVERTER TRANSFORMER GRID SIDE BUSHING .....	583
<i>Li Xining, Tang Hao, Yang Fan, Cheng Huanchao, Zhang Shuqi</i>	
STUDY ON THE DEVELOPING REGULARITY OF PARTIAL DISCHARGE AT THE INTERFACE DEFECTS OF CABLE ACCESSORIES UNDER THERMAL CYCLING.....	587
<i>Bin Feng, Shuai Hou, Lin Zhang, Wenbo Zhu, Ying Yu, Xiaojing Dang</i>	

THE MATERIAL PROPERTIES AND INSULATION DESIGN FOR 35KV FLEXIBLE AND TORSION RESISTANT CABLE .....	591
<i>Xiangyu Fan, Jing Xu, Jinghui Gao, Lisheng Zhong, Liang Wang, Xiyuan Zhao</i>	
INTERFACE CHARACTERISTIC OF EXTRUSION-MOLDED JOINTS OF 500KV SUBMARINE CABLES .....	596
<i>Chang-Ji Zheng, Run-Pu Shi, Hong Zhao</i>	
RESEARCH ON THE ICE SHEDDING OF UHV TRANSMISSION LINES AND ITS PREVENTION MEASURES.....	600
<i>Xiu Yan, Liming Wang, Fanghui Yin</i>	
DISTRIBUTION NETWORK ARC SUPPRESSION COIL DISTRIBUTED COMPENSATION AND ITS INFLUENCE ON FAULT LINE SELECTION .....	604
<i>Zhenqiang Li, Min Dai, Chuanquan Liu, Ying Lou</i>	
MECHANICAL STRESS DISTRIBUTION AND RELIABILITY ANALYSIS OF GIL TRI-POST INSULATOR .....	608
<i>Songtao Liu, Jin Li, Boxue Du, Hucheng Liang, Liucheng Hao, Yaxiang Wang</i>	
CHARACTERISTICS OF GLASS INSULATOR HOT WATER DEICING .....	612
<i>Xiaohong Ma, Bingzhe He, Zhijin Zhang, Qi Yang, Lusong Zhang, Huan Huang</i>	
RESEARCH ON A PASSIVE NON-INTERVENTIONAL COMBINED ANTI-ICING METHOD FOR OVERHEAD LINE STRUCTURE .....	616
<i>Jun Liu, Ran Li, Yu Lei, Zhijin Zhang, Haitao Fu</i>	
RESEARCH ON AN OPTIMAL DESIGN METHOD OF ANTI-ICING AND ANTI-GALLOPING DEVICE BASED ON LOADING PRINCIPLE.....	620
<i>Binghong Lu, Jun Liu, Zhijin Zhang, Yu Lei, Haitao Fu</i>	
EFFECT OF DIFFERENT OPERATIONAL CONDITIONS ON DISTRIBUTION OF TEMPERATURE FIELD IN HV DIRECTLY BURIAL POWER CABLES .....	624
<i>Li Liu, Jinxian Li, Luyao Zhou, Shaohua Wang, Fan Yang</i>	
STUDY ON MECHANICAL CHARACTERISTICS OF GIL THREE POST INSULATOR UNDER DIFFERENT LOADS.....	628
<i>Xi Chen, Yuan La, Chao Gao, Fusheng Zhou, Ruodong Huang, Guoli Wang, Yao Zheng</i>	
SEISMIC PERFORMANCE OF $\pm 800$ KV ULTRA-HIGH VOLTAGE CONVERTER TRANSFORMER-BUSHING SYSTEM.....	632
<i>Dexu Zou, Linjie Zhao, Chang He, Qiang Xie</i>	
THE DOMESTIC AND FOREIGN STANDARD ANALYSIS OF T100A TEST FOR HIGH VOLTAGE AC CIRCUIT BREAKER .....	636
<i>Xuefeng Guo, Yongqi Yao, Zhijun Wang, Yunpeng Sha, Qi Zuo, Nannan Zhang</i>	
A PRELIMINARY STUDY ON ANTI-EXPLOSION PERFORMANCE OF UHV TRANSFORMER .....	640
<i>Suwen Chen, Gan Du, Qiang Xie, Guanglei Qu</i>	
SURFACE CHARGE AND ELECTRIC FIELD DISTRIBUTION ALONG TRI-POST INSULATORS IN $\pm 800$ KV GIL .....	644
<i>J. N. Dong, B. X. Du, J. Li, H. C. Liang, H. Yao, Y. Chen</i>	

RESEARCH ON ERROR CHARACTERISTICS OF THREE-PHASE TWO-ELEMENT COMBINED TRANSFORMER UNDER SIMULATION OPERATING CONDITIONS .....	648
<i>Cong Lin, Fuyong Cheng, Qingchan Liu, Zhaolei He, Jun Sun, Jixiong Xiao</i>	
A DC COMBINED APPARATUS FOR DC 1.5 KV RAIL TRANSIT TRACTION SYSTEMS .....	652
<i>Jiangxiang Peng, Haixia Zhang, Junhai Wang, Bin Xiang, Hongxu Li, Lei Gao, Dongyu Wang, Xuedong Wang, Zhiyuan Liu</i>	
INFLUENCE OF THE LENGTH AND THICKNESS OF NONLINEAR MATERIAL ON ELECTRIC FIELD DISTRIBUTION IN CABLE TERMINAL .....	656
<i>Qinghao Yang, Jun Hu, Zhikang Yuan, Jinzhong Li, Yu Yin, Hao Tang</i>	
COMPACT DESIGN FOR 550 KV GIS INSULATION SYSTEM.....	659
<i>Chao Wang, Wen-Dong Li, Zhi-Hui Jiang, Hao-Yang Yin, Xiong Yang, Guan-Jun Zhang, Yi-Fan Zhang, Ming-Li Fu, Bing Luo</i>	
LIGHTNING PROTECTION PERFORMANCE OF 500KV LINEAR TOWER SUSPENSION STRING COMPOSITE INSULATOR INSTEAD OF PORCELAIN INSULATOR.....	663
<i>Zheng Hanyu, Zhang Zhijin, Xu Jun, Wang Xiaojie, Jiang Xingliang</i>	
RESEARCH ON MATCHING OPERATION OF DC CIRCUIT BREAKER AND SUPERCONDUCTING FAULT CURRENT LIMITER.....	667
<i>Yingdun Hei, Xingmei Zhou, Yaxiong Tan, Minqian Wen, Wei Chen, Jiajun Pan</i>	
EFFECTS OF CONDUCTOR PRE-TENSION ON SEISMIC PERFORMANCE OF CONVERTERTRANSFORMER BUSHING .....	671
<i>Shan Wang, Jianwei Cheng, Yunlong Chen, Qiang Xie</i>	
ANALYSIS ON BIRD DAMAGE ACCIDENT OF OVERHEAD TRANSMISSION LINES IN NINGXIA REGION AND OPTIMIZATION DESIGN OF INSULATING GRADING RING .....	675
<i>Zihan He, Hong Wu, Xiulei Hu</i>	
ON SITE TEST RESEARCH AND APPLICATION OF FLEXIBLE SHORT-CIRCUIT CURRENT SUPPRESSION TECHNOLOGY BASED ON 220KV FAST CIRCUIT BREAKER.....	679
<i>Jin Yuqi, Yang Yong, Shao Xianjun, Wang Shaoan, Zhao Lin, Xu Ning</i>	
ANALYSIS OF THE INFLUENCE OF THE STRUCTURE OF THE ARC CHAMBER OF THE HIGH VOLTAGE SF6 CIRCUIT BREAKER ON THE BREAKING CHARACTERISTICS OF THE CAPACITOR BANK .....	683
<i>Wenlong Yi, Yisong Zhao, Feiming Wang, Bing Li, Shanshan Zhang</i>	
SIMULATION ANALYSIS ABOUT ANTI-DC EFFECT OF CURRENT TRANSFORMER WITH AIR GAPPED CORE.....	687
<i>Fuyong Chen, Ye Chen, Tong Han, Cong Lin, Ming Cao, Jun Sun, Shuai Yang</i>	
CLOUD-MODEL-BASED EFFECTIVENESS EVALUATION FOR DEICING ROBOTS OF OVERHEAD POWER LINES.....	691
<i>Bing Luo, Wei Liang, Yanpeng Hao, Lin Yang, Tingting Wang, Licheng Li</i>	
GIS ROOM AUTONOMOUS INSPECTION SYSTEM BASED ON MULTI-ROTOR UAV .....	695
<i>Qi Li, Yan Dai, Rui Han, Donglian Qi, Yunfeng Yan</i>	
INFLUENCING FACTORS ON THE AMPACITY OF EVS CABLES .....	699
<i>Yifang Wang, Jin Li, Xiaoxiao Kong, Boxue Du, Jing Xu, Chuanbin Wang</i>	
SEISMIC PERFORMANCE AND ISOLATION DESIGN FOR 220KV SURGE ARRESTER.....	703
<i>Hao Li, Long Shen, Yaolong Wang, Xin Wang, Zhenyu Yang, Qiang Xie</i>	

STUDY ON THE CURRENT CONCENTRATION AND LOCAL HEATING OF THE BUFFER LAYER IN HV XLPE CABLES.....	707
<i>Ying Liu, Jiamei Chen, Heyan Zhang</i>	
STUDY ON PRESSURE VARIATION CHARACTERISTICS OF CABLE ACCESSORIES INTERFACE UNDER TEMPERATURE CYCLING.....	711
<i>Shuai Hou, Haoyu Wang, Ying Yu, Bin Feng, Wenbo Zhu, Yifan Zhang</i>	
TRANSFORMER FAULT CAUSED BY STRUCTURE DEFECT OF RESIN IMPREGNATED FIBERGLASS BUSHING .....	715
<i>Dexu Zou, Linjie Zhao, Kejie Huang, Jianwei Cheng, Shuaibing Wang, Wei Zhang</i>	
THERMAL AGING DEPENDENT SURFACE CHARGE CHARACTERISTICS OF FLUORINATED OIL-PAPER INSULATION UNDER THE HARMONIC SUPERIMPOSED DC VOLTAGES.....	719
<i>Wenbo Zhu, Mingli Fu, Shuai Hou, Baojun Hui, Yifan Zhang, Bin Feng, Jun Chen, Le Gu, Huihong Huang</i>	
STUDY ON DISCHARGE CHARACTERISTICS OF MULTILAYER OIL-PAPER UNDER HIGH FREQUENCY PULSE VOLTAGE .....	723
<i>Liu Cheng, Gao Bo, Li Xiaonan, Liu Kai, Yang Yan</i>	
RESEARCH ON THE INFLUENCE MECHANISM OF THERMAL AGING DEGREE OF CABLE ON FREQUENCY DOMAIN REFLECTOMETRY AND DEFECT LOCATION ACCURACY.....	727
<i>Haotian Zhang, Haibao Mu, Xingyu Zou, Daning Zhang, Xu Lu, Jie Tian, Peng Yu, Ning Ding, Guanjun Zhang</i>	
THE INSULATION CHARACTERISTICS OF OPTICAL FIBER IN TRANSFORMER OIL UNDER LONG-TERM THERMAL AGING.....	731
<i>Ning Ding, Chengjun Wang, Haibao Mu, Jiangyang Zhan, Huanmin Yao, Lingfeng Jin, Ping Qian, Chen Li, Guanjun Zhang</i>	
INFLUENCE OF REPLACING OIL WITH DIFFERENT NATURAL ESTERS ON THE THERMAL AGEING BEHAVIOR OF MINERAL OIL-PAPER INSULATION.....	736
<i>Chenyu Gao, Wenyu Ye, Qing Xu, Mengzhao Zhu, Wenbing Zhu, Jian Hao</i>	
CHARACTERISTICS OF THE PARTIAL DISCHARGE IN OIL-PAPER CAVITY UNDER THE VALVE VOLTAGE WAVEFORM OF CONVERTER TRANSFORMER .....	740
<i>Weidong Sun, Lijun Yang, Zhiren Xu, Yiheng Wei</i>	
BEHAVIOR OF POSITIVE STREAMERS IN ESTER LIQUIDS AND MINERAL OIL IN A NON-UNIFORM FIELD WITH AND WITHOUT INSULATING PRESSBOARD BARRIER.....	744
<i>Pawel Rozga, Filip Stuchala, Dariusz Hantsz, Feipeng Wang, Zijia Shen, Jian Li</i>	
A STUDY ON THE NON-LINEARITY OF DIELECTRIC RESPONSE IN TIME DOMAIN OF OIL-PAPER INSULATION .....	748
<i>Hongsheng Zhan, Chuanhui Cheng, Ran Zhuo, Mingli Fu, Zhiming Huang, Yan Luo</i>	
REGULATION OF SURFACE CHARGE ACCUMULATION ON EPOXY INSULATOR BY FLEXIBLE COATING UNDER DC VOLTAGE .....	752
<i>Huicun Zhao, Yu Gao, Wenqu Wang, Xiaochen Yuan, Huan Wang</i>	
SPACE CHARGE AND DC BREAKDOWN STRENGTH OF PROPYLENE-ETHYLENE COPOLYMER/POLYPROPYLENE COMPOSITE .....	756
<i>Lin Li, Mengyang Chen, Xuecheng Zhu, Bing Han, Jian Zhang, Jiaming Yang, Hong Zhao</i>	



RESEARCH ON THE CHARACTERISTIC AND MECHANISM OF FIELD EMISSION FROM METAL-SUBSTRATE GRAPHENE CONTACT .....	760
<i>Ziru Zha, Senkun Mei, Zhipeng Zhou, Zhenxing Wang, Zhiyuan Liu</i>	
SURFACE CHARGE ACCUMULATION ON A REAL SIZE EPOXY SPACER IN VARIOUS GAS ATMOSPHERES UNDER DC VOLTAGE .....	764
<i>Wenqu Wang, Zhonglei Li, Yu Gao, Huicun Zhao, Huan Wang, Xiaochen Yuan</i>	
NON-CONTACT IDENTIFICATION METHOD FOR CARBON STEEL CORROSION GRADE OF TRANSMISSION TOWER BASED ON HYPERSPECTRAL TECHNOLOGY .....	768
<i>Kun Yang, Chaoqun Shi, Yujun Guo, Xueqin Zhang, Chunmao Li, Guangning Wu</i>	
CHARACTERISTICS ANALYSIS AND EXPERIMENTAL VERIFICATION OF AMORPHOUS METAL DISTRIBUTION TRANSFORMER CORE VIBRATION COUPLED BY ELECTROMAGNETIC - MECHANICAL FIELD .....	772
<i>Jiachen Li, Daosheng Liu, Peng Li</i>	
EFFECT OF $\beta$ -SPHERULITE ON ELECTRICAL TREE CHARACTERISTICS OF ISOTACTIC POLYPROPYLENE INSULATION .....	776
<i>Shuofan Zhou, Mingsheng Fan, Zhonglei Li, Boxue Du, Fan Yu, Hongda Yan</i>	
EFFECT OF CRYSTALLINE MORPHOLOGY ON DC-PRESTRESSED BREAKDOWN CHARACTERISTICS OF PP-BASED CABLE INSULATION .....	780
<i>Mingsheng Fan, Shuofan Zhou, Zhonglei Li, Boxue Du, Fan Yu, Hongda Yan</i>	
DYNAMIC BEHAVIOR OF SPACE CHARGE IN DOUBLE-LAYER INSULATION STRUCTURE UNDER HIGH EXTERNAL ELECTRIC FIELD .....	784
<i>Ling Zhang, Yuxuan Xu, Quzong Gesang, Zhichao Qiao, Bo Zhang, Yuanxiang Zhou</i>	
STUDY ON THE LIGHTNING STRIKE DISCHARGE CHARACTERISTICS OF AIR GAP AT LOW AIR PRESSURE CONDITION .....	788
<i>Li Jin, Zhu Xinhao, Wang Qiang, Zhang Zhijin, Jiang Xingliang</i>	
OBSERVATIONS OF SHOCKWAVE PHENOMENA IN DIELECTRIC LIQUIDS: COMPARISON BETWEEN LENS-TYPE AND MIRROR-TYPE SCHLIEREN PHOTOGRAPHY TECHNOLOGIES .....	792
<i>Wei Peng, Mingxiang Xiong, Xianqin Deng, Zhiyan Peng, Wu Lu, Wenbin Zhao</i>	
EFFECT OF TEMPERATURE ON DIELECTRIC PROPERTIES OF METALLIZED FILM CAPACITOR .....	796
<i>Yushuang He, Feipeng Wang, Jianyu Pan, Haider M. Umran, Li Ran, Zhengyong Huang</i>	
INTERFACE DEFECT BREAKDOWN PROPERTY AND ELECTRIC FIELD SIMULATION OF DISTRIBUTION CABLE ACCESSORIES .....	800
<i>Guoqiang Su, Xiaojian Liang, Guochang Li, Jiaying Wang, Xuejing Li, Yanhui Wei</i>	
COUPLING EFFECTS OF ELECTRIC AND FLOW FIELDS ON THE CONDUCTIVITY OF INSULATING OIL .....	804
<i>Xianlong Ma, Qiling Guo, Chengjun Guo, Li Cheng, Lijun Yang</i>	
DEFECT IDENTIFICATION METHOD OF OIL-IMPREGNATED PAPER BUSHING BASED ON POLARIZATION/DEPOLARIZATION CURRENT UNDER HIGH VOLTAGE .....	808
<i>Zheng Jian, Jian Hao, Qiang Liu, Xiaowei Liu, Yu Shang, Yong Liang</i>	
RESEARCH ON PARTIAL DISCHARGE SOURCE POSITIONING IN SWITCHGEAR BASED ON PSO .....	812
<i>Xiaokang Wang, Bo Niu, Baoning Hu, Haichuan Jin, Zhiyong Wu, Dongfang Wang</i>	

QUANTUM MODEL OF FIELD EMISSION BASED ON EXCHANGE-CORRELATION EFFECT AT NANOSCALE .....	816
<i>Nan Li, Xinyu Gao, Ziang Jing, Bing Xiao, Kai Wu, Yonghong Cheng</i>	
RESEARCH ON PRESSURE CHARACTERISTICS OF TANK WALL DURING INTERNAL FLASHOVER DISCHARGE UNDER AC VOLTAGE OF OIL TANK .....	819
<i>Jianan Si, Zhiguo Hao, Xingwang Wu, Zhongxin Xue, Boyu Li, Haitao Yang</i>	
PARTIAL DISCHARGE MEASUREMENT OF POWER MODULE PACKAGING INSULATION UNDER SQUARE WAVE WITH SHORT TRANSITION TIME BASED ON SHF-DOWN-MIXING METHOD .....	822
<i>Yi Ding, Yalin Wang, Mingyu Zhou, Hao Sun, Wenyi Li, Yi Yin</i>	
THE ORIENTATION OF BN NANOSHEET IN POLYIMIDE TO IMPROVE THE THERMAL CONDUCTIVITY OF EPOXY RESIN .....	826
<i>Bolun Shi, Zhengyong Huang, Jian Li, Feipeng Wang</i>	
ANALYSIS OF MICROSCOPIC PROCESS OF INSULATOR FITTINGS FOR DC TRANSMISSION LINES .....	830
<i>Xiaobin Cao, Yufeng He Shisong Yang, Tao Li, Chenxia Gao, Ping Tang, Yawei Li</i>	
CALCULATION OF MOISTURE CONTENT OF OIL-IMMERSED PAPERBOARD BASED ON 10-4 HZ RELATIVE PERMITTIVITY .....	834
<i>Yiming Xie, Jiangjun Ruan, Zhiye Du, Shuang Liu, Xuefeng Yin, Yongqing Deng</i>	
AGING STATE EVALUATION OF INSULATION PAPER BASED ON IMAGE FEATURE EXTRACTION .....	838
<i>Jiaqi Cui, Haiying Dong, Shuaibing Li, Yongqiang Kang</i>	
ANALYSIS ON THE PHYSICAL AND CHEMICAL PROPERTIES OF DECAY-LIKE FRACTURE COMPOSITE INSULATOR SHED .....	842
<i>Dong Kai, Zhang Zhijin, Lu Ming, Gao Chao, Jiang Xingliang</i>	
THE METHOD OF LIFESPAN PREDICTION OF INSULATING PAPER UTILIZED IN CONVERTER TRANSFORMER CONSIDERING THE MECHANICAL STRESS .....	846
<i>Xianlong Ma, Qiling Guo, Chengjun Guo, Li Cheng, Lijun Yang</i>	
MOLECULAR DYNAMICS STUDY ON KINEMATIC VISCOSITY OF PEANUT OIL METHYL ESTER .....	850
<i>Binghao Chen, Qinpan Qiu, Xiao Peng, Jingwen Zhang, Chao Tang</i>	
STUDY ON THE ARC CHARACTERISTICS OF INSULATOR CREEPING DISCHARGE UNDER HIGH VELOCITY AIR .....	855
<i>Guangquan Zhang, Xueqin Zhang, Bo Wang, Qing Du, Yujun Guo, Guangning Wu</i>	
THERMAL NETWORK MODEL OF IGBT MODULE BASED ON THE INFLUENCE OF TEMPERATURE .....	859
<i>Chuyu Tian, Yaxiong Tan, Jianfa Wu, Jian Li</i>	
AC POLLUTION FLASHOVER PERFORMANCE OF INSULATORS IN LOW ATMOSPHERE PRESSURE CIRCUMSTANCE .....	865
<i>Li Jin, Li Ran, Wang Jilai, Zhang Zhijin, Jiang Xingliang</i>	
NUMERICAL SIMULATION OF SURFACE DISCHARGE IN OIL-PAPER INSULATION UNDER VARIOUS TEMPERATURES .....	870
<i>Jianning Chen, Yuanxiang Zhou, Yunzhou Zhao, Ling Zhang, Xin Huang, Jiamin Ge</i>	

A SIMPLE AUTOMATIC MESH GENERATION FOR COMPLEX ELECTRIC AREA .....	874
<i>Xiaosong Zhu, Tong Wu, Yuan Fang, Shi Long, Youyuan Wang</i>	
INFLUENCE OF RESIDUAL SOLVENT ON THE DIELECTRIC PERFORMANCES OF POLYMER DIELECTRICS .....	878
<i>Jiaming Luo, Wenjie Sun, Lei Zhang, Jiale Mao, Yuanlong Xie, Yonghong Cheng</i>	
STUDY ON DC FLASHOVER CHARACTERISTICS OF OIL-PAPER INTERFACE UNDER UNIFORM ELECTRIC FIELD .....	882
<i>Shuangzan Ren, Jingfeng Wu, Hao Wu, Dongxin Hao, Hao Xu, Zhi Li, Kai Wu</i>	
DIELECTRIC BARRIER DISCHARGE PLASMA FUNCTIONALIZATION OF CARBON NANOTUBES SURFACE CO <sub>2</sub> AND N <sub>2</sub> TREATMENTS .....	886
<i>Hao Li, Guoqiang Gao, Qichen Chen, Zefeng Yang, Wenfu Wei, Guangning Wu</i>	
EFFECT OF MAGNETIC FIELD ON THE CURRENT-CARRYING FRICTION AND WEAR PERFORMANCE OF C/CU CONTACT PAIRS .....	890
<i>Zhijiang He, Ziran Ni, Hong Wang, Zefeng Yang, Wenfu Wei, Xiao Wang, Lei Deng, Guangning Wu</i>	
RESEARCH ON TRANSFER CHARACTERISTICS OF PARTIAL DISCHARGE PULSE IN TRANSFORMER WINDING.....	894
<i>Wenrong Si, Chenzhao Fu, Kaining Hou, Xinbo Lu, Liangkai Wang, Qingquan Li</i>	

**Author Index**