

## Poster Sessions

### Session 2 Poster: Performance of Insulating Materials

Monday, April 8<sup>th</sup>, 2019, 16:15 – 18:30

Venue: International Convention Hall, 1<sup>st</sup> F

Session Chairs: Zhimin Dang, Xingyi Huang

- 2-2-1 Thermal and Electrical Properties of Room Temperature Curing Epoxy Resin Modified with Hydroxyl-Terminated Nitrile Rubber  
*Chuang Wang, Jing Jia, Qing Sun, Lang Zhao, Rong Jia (Xi'an University of Technology, China), Zongren Peng (Xi'an Jiaotong University, China)*
- 2-2-2 Dielectric Strength and Space Charge of Ethylene Propylene Rubber under Different Pre-stress  
*R.X. Zhao, R.J. Men(Taiyuan University of Technology, China),Z.P. Lei(Taiyuan University of Technology, China) (University of Bologna, Italy), P. L. Geng, J.C. Song(Taiyuan University of Technology, China), C.Y. Li(University of Bologna, Italy)(Tsinghua University, China), X.X. Xu (State Grid Hebei Maintenance Branch of China, China)*
- 2-2-3 Synthesis and Application of Ag<sub>2</sub>O Doped ZnO Based Sensor for Detecting CH<sub>4</sub> Gas  
*Tingting Wang, Yifan Liao , Bing Luo (Electrical Power Research Institute of China Southern Power Grid, China), Zhaorui Lu(Southwest University, China),Qu Zhou(Southwest University, China) (Chongqing University, China), Zhijie Wei(Southwest University, China), Weigen Chen(Chongqing University, China)*
- 2-2-4 Parametric Reconstruction of Permittivity Graded Materials Based on Electrical Capacitance Tomography  
*Chao WANG, Xiao-Ran LI, Wen-Dong LI, Li-Yuan ZHANG, Guan-Jun Zhang (Xi'an Jiaotong University, China)*
- 2-2-5 Effect of Crystallization Conditions on Space Charge Characteristics of  $\beta$ -pp  
*S. L. Liu, J. M. Yang, X. Wang, H. Zhao, M. Z. Gao, H. He ,B. Han (Harbin University of Science and Technology, China), M. Hu, S. H. Xie (Technology Submarine Cable Co., Ltd. China)*
- 2-2-6 Effect of Surface Smoothness on Electrical Tree Characteristics at XLPE-SIR Interface  
*Yu Su, Ying Liu, Rui Lian, Xin Gao, Lisheng Zhong (Xi'an Jiaotong University, China)*
- 2-2-7 Uncertainties Analysis in Space Charge Measurement  
*Z.B. Cao, Y.W. Zhang, F.H. Zheng, Z.L. An (Tongji University, China)*
- 2-2-8 Study on electrical properties of superhydrophobic coating covered with moss  
*Tingting Wang(Power Grid Technology Research Center of China Southern Power Grid, China), Qianbo Xiao(Electric Power Research Institute of State Grid Chongqing Electric Power Company, China), Fuzeng Zhang(Power Grid Technology Research Center of China Southern Power Grid, China) ,Bangfei Deng(Electric Power Research Institute of State Grid Chongqing*

*Electric Power Company, China), Jian Li, Zhengyong Huang, Feipeng Wang (State Key Laboratory of Power Equipment & System Security and New Technology, China)*

- 2-2-9 Effects of ZnO Sputtering Layer on Surface Charge and Surface Discharge of Oil-impregnated Paper  
*J.P. Jiang, B.X. Du, J. Li (Tianjin University, China), W.B. Zhu (Tianjin University, China) (Electric Power Research Institute, China), X.X. Kong (Tianjin University, China)*
- 2-2-10 Influence of Electrode Material in Acoustic Attenuation Factors Calculation in Space Charge Measurements  
*G. A. Mier-Escorra, A. Rodrigo-Mor (Delft University of Technology, The Netherlands)*
- 2-2-11 Temperature Dependent Surface Charge and DC Flashover Voltage of Fluorinated Polypropylene Film  
*R. R. Xu, B. X. Du, J. Li (Tianjin University, China), W. B. Zhu (China South Power Grid, China), H. L. Liu, C. L. Han, Z. H. Hou, M. Y. Wang (Tianjin University, China)*
- 2-2-12 The Influence of an Air Gap at The Needle/Polymer Interface on Electrical Tree Growth  
*H. Zheng, S. Rowland, F. Liu, Z. Lv (University of Manchester, UK)*
- 2-2-13 Study of Space Charge Accumulation Property in Polyethylene under Applied Voltage of Square Wave  
*Xia Wang, Zi-Hang Shu, Shen-jie Duan, Hua-nan Wang, Shuai Liu (Xi'an Jiaotong University, China)*
- 2-2-14 Distinct Initiation Processes of Vacuum Flashover under Non-uniform Field a Multiphase Framework  
*G.Y. Sun, N. Yang, S. Zhang, B.H. Guo, R.D Zhou, C.H. Zhou, G.J. Zhang (Xi'an Jiaotong University, China)*
- 2-2-15 The Influence of Pulse Repetition Rate on the Behavior of Nanosecond Pulsed Dielectric Barrier Discharges  
*Xin Yang, Kai Wu, Yongpeng Meng, Yan Du, Xinzhe Ma (Xi'an Jiaotong University, China)*
- 2-2-16 Study on Development Process of White Marks on Pressboard Surface Layers in Needle-Plate Model under Different Curvature Radius  
*Rui. Yu, Bo. Gao, Liu Cheng, Zhuang Xin, Zhou Peng, G.N. Wu (Southwest Jiaotong University, China)*
- 2-2-17 Partial Discharge Characteristic on Pressboard Surface under Different DC Polarity  
*Rui. Yu, Peng Zhou, Bo. Gao, G.N. Wu (Southwest Jiaotong University, China)*
- 2-2-18 A Comparative Study on the Temperature Resistance of High Temperature Vulcanized Silicone Rubber and Liquid Silicone Rubber  
*Wenqing Lai (State Grid East Inner Mongolia Electric Power Company, China), Ying Lin (Graduate School at Shenzhen, Tsinghua University, China), Yonghong Wang (State Grid East Inner Mongolia Electric Power Company Research Institute, China), Yuhao Liu (Graduate School at Shenzhen, Tsinghua University, China), Xiujiang Zuo (State Grid East Inner Mongolia Electric Power Company Research Institute, China), Liming Wang (Graduate School at*

*Shenzhen, Tsinghua University, China), Tianqi Liu(State Grid East Inner Mongolia Electric Power Company Research Institute, China)*

- 2-2-19 Numerical Simulation on Transition from Positive Glow Discharge to Streamer Discharge  
*Yong Yi(Tsinghua-Berkeley Shenzhen Institute, Tsinghua University, China), Wenxi Tang, Yingyue Sun, Liming Wang(Tsinghua-Berkeley Shenzhen Institute, Tsinghua University, China) (Graduate School at Shenzhen, Tsinghua University, China)*
- 2-2-20 The Study of The Electrical Strength of Epoxy Resin Board in The High Altitude Area  
*Bing Luo (Electrical Power Research Institute of China South Grid, China) , Yufeng Shen, Hao Li, Liangwu Sun, Yichao Liang, Jichao Yang (Qinghai University, China), Chao Gao, Yifan Liao (Electrical Power Research Institute of China South Grid, China)*
- 2-2-21 Thermal Conductivity and Adhesion Strength of Epoxy Resin with Ferrite Filler  
*Sergej V. Serebryannikov, Anatoliy P. Cherkasov, Sergej S. Serebryannikov, Dolgov A. A., Khromov V.A. (National Research University, Russia)*
- 2-2-22 Simulation of Space Charge Distribution in The Needle-Plate Electrode  
*Xi Zhu, Yi Yin, Meng Chen, Pengfei Su and Jiandong Wu (Shanghai Jiao Tong University, China)*
- 2-2-23 Conductivity and Surface Charge Properties of HTV SiR/SiC Composites under Impulse Superimposed on DC Voltage at Different Temperatures  
*Chong Han, Zhonglei Li, Zhuoran Yang, Meng Xiao ,Boxue Du (Tianjin University, China)*
- 2-2-24 Effect of Elastomer Content on Interface Discharge Behavior Between Polypropylene and Silicone Rubber under AC Voltage  
*L. Y. Chen, Y. F. Zhu, G. K. Xu, Y. X. Yun, X. Li, W. W. Zhang (State grid Shandong Electric Power Research Institute, China)*
- 2-2-25 Study of DC Breakdown in Multilayered Insulation Systems  
*Miao Hao, Yunpeng Zhan, George Chen (University of Southampton, UK) , Lu Pu, Xuefeng Zhao, Wei Duan, Haofei Sun, Zeli Ju, Nan Wang (State Grid Shaanxi Electric Power Research Institute, China)*

### **Session 3 Poster: Nanodielectrics and New Dielectrics**

Monday, April 8<sup>th</sup>, 2019, 16:15 – 18:30

Venue: International Convention Hall, 1<sup>st</sup> F

Session Chairs: Junwei Zha, Xiangrong Chen

- 2-3-1 Study on Electrical Aging Properties of Polyethylene Based Nanocomposite  
*Zhang Xiaohong, Huang Lei, Shi Zexiang, Xia Chen, Guo Ning (Harbin University of Science and Technology, China)*
- 2-3-2 Preparation of Polypyrrole Nanospheres and Their Effect on Space Charge Behavior of Polyethylene  
*C. M. Li, D. H. Cheng, C. C. Zhang(Harbin University of Science and Technology, China), D.*

*J. Gao(State Grid Beijing Maintenance Company, Beijing, China), B. Z. Han,(Shanghai Qifan Cable Co. Ltd., China)*

2-3-3 Effect of Silica Modification on Charge Trapping Behavior of PP Blend/Silica Nanocomposites  
*Amirhossein Mahtabani, Xiaozhen He, Rafał Anyszka, Wilma Dierkes, Anke Blume (University of Twente, The Netherlands), Ilkka Rytöluoto, Kari Lahti (Tampere University of Technology, Finland), Mika Paajanen, Eetta Saarimäki (VTT Technical Research Centre of Finland Ltd, Finland)*

2-3-4 Study on The Optical and Electrical Parameters of Porcelain Material Based on Terahertz Wave  
*Lanxin Li , Hongwei Mei, Wangsong Wu, Jiaxin Yang, Liming Wang (Tsinghua University, China), Chenjun Guo (Yunnan Power Grid Co., Ltd, China)*

2-3-5 Dielectric and Mechanical Properties Evaluation of Polypropylene Containing Nitride-based Nanoparticles  
*Zheng Lian, Xinyu Wang, Thomas Andritsch(University of Southampton, UK)*

2-3-6 Surface Modification of Fumed Silica by Dry Silanization for PP-based Dielectric Nanocomposites  
*Xiaozhen He, Amirhossein Mahtabani, Rafał Anyszka, Wilma Dierkes, Anke Blume (University of Twente, The Netherlands), Ilkka Rytöluoto, Kari Lahti (Tampere University of Technology, Finland), Eetta Saarimäki, Mika Paajanen (VTT Technical Research Centre of Finland Ltd, Finland)*

2-3-7 Space Charge and Breakdown Strength Behavior of PP/POE/MgO Nanocomposites  
*Min Wei, Xinyu Wang, Thomas Andritsch (University of Southampton, UK)*

2-3-8 Study on Surface Charge Characteristics of Polyethylene/SiO<sub>2</sub> Nano-composites Observed by Kelvin Probe Force Microscope  
*Jiaxin Chang, Bai Han, Xuesong Lv, Jianyu Wang, Zhi Sun, Wei Song, Xuan Wang (Harbin University of Science and Technology, China)*

2-3-9 Study on Nonlinear Conductivity and Breakdown Characteristics of Zinc Oxide Nano Sheets/EPDM Composites  
*Qingguo Chi, Mengjia Feng, Tiandong Zhang, Changhai Zhang, Xuan Wang, Qingquan Lei (Harbin University of Science and Technology, China)*

2-3-10 Comparative Study of Aging and New-made LSR Materials Used for HVDC Converter Substation  
*Xiaoxing Wei, Wenhao Lu, Wanying Liu(China Southern Power Grid Co., Ltd., China), Chi Xu, Zhidong Jia (Tsinghua University, China)*

2-3-11 Study on Thermal and Electrical Properties of BPAF Modified Epoxy/Al<sub>2</sub>O<sub>3</sub> Composites  
*Yang Kerong, Zhao Yushun, Zhang Song, He Yuanhan, Wang Xuepei(Hefei University of Technology, China)*

2-3-12 Influence of Low-temperature Characteristics on Accuracy of Full- Fiber ECT  
*Ye Fei, JiangBo Chen, Anlan Mao(China Electric Power Research Institute, China), Ye Fei,*

*JiangBo Chen, Anlan Mao(State Key Laboratory of Power Grid Environmental Protection, China), Chunlai Yu(Heilongjiang Electric Power Research Institute, China), Jingjing Wang(.State Grid Electric Power Research Institute, China), Huan Zhao(North China Electric Power University, China)*

2-3-13 Experimental Study on the Electrical Properties of Polypropylene Composite Insulation Material Mixed With Nano-Clay

*Chuyan Zhang(China University of Geosciences, China)*

2-3-14 Accumulation of Space Charges in Epoxy Resin Nanodielectrics Influenced by Poole-Frenkel Effect

*Haozhe Cui, Chenyu Yan, Rui Mi, Daomin Min, Shengtao Li (Xi'an Jiaotong University, China), Zhaoliang Xing (Global Energy Interconnection Research Institute co. Ltd., China), Qingzhou Wu (China Academy of Engineering Physics , China)*

2-3-15 Preparation and Properties of Nano-Cellulose Modified Natural Ester Liquids

*Sijing He, Zhengyong Huang, Shubin Hou(Chongqing University, China), Li Han, Ling Liu, Jianwei Wang (Jinzhong Power Supply Company of State Grid Shanxi Electric Power Company, China)*

2-3-16 Depth Profile and Transport of Positive and Negative Charge in Surface (2-D) and Bulk (3-D) Nanocomposite Films

*Quyét D. Nguyen, Jingwen Wang, Dmitry Rychkov, Reimund Gerhard(University of Potsdam, Germany)*

2-3-17 Study on Electric Tree of Nano-SiO<sub>2</sub> Polypropylene Composite Insulation Material

*Mingze Gao, Jiaming Yang, Hong Zhao(Harbin University of Science and Technology, China), Ming Hu, Shuhong Xie (Zhongtian Technology Submarine Cables Co., Ltd, China)*

2-3-18 Study on Polarization and Depolarization Characteristics of Epoxy / BaTiO<sub>3</sub> Nano-composites

*Jingyi Liu, Zhonghua Li, Yongsen Han, Yunlong Sun (Harbin University of Science and Technology, China)*

2-3-19 Investigation on Dry Band Arcing Induced Tracking Failure on Nanocomposites of EPDM Matrix

*M. Tariq Nazir, B.T. Phung, Imrana Kabir, A. C. Y. Yuen, G. H. Yeoh (University of New South Wales, Australia), Yuanyuan Zhang, Shihu Yu, Shengtao Li (Xi'an Jiaotong University, China), Shihu Yu(Electric Power Research Institute of Guangdong Power Grid Co. Ltd., China)*

2-3-20 The Effects of Nano-SiO<sub>2</sub> on the Electrical Treeing Resistance of XLPE

*Chunyang Li, Jiaming Yang, Chengcheng Zhang, Ye Ai, Hong Zhao (Harbin University of Science and Technology, China), Baozhong Han (Shanghai Qifan Cable Co., Ltd., China)*

2-3-21 Surface Corona Aging of Epoxy/SiO<sub>2</sub> Nanocomposites

*Jiao Xiang, Chuang Zhang, Shihang Wang, Hang Fu, Jianying Li(Xi'an Jiaotong University, China), Zhaoliang Xing (Global Energy Interconnection Research Institute co. Ltd., China)*

2-3-22 Study on Preparation and Thermal Conductivity of Liquid Crystal Epoxy Resin filled with Nanocellulose/ BNNSs

*Feng Wang, Chenglong Ma (Jiayuguan power supply company of State grid Gansu electric power company, China), Li Han, Ling Liu, Jianwei Wang (Jinzhong power supply company of State grid Shanxi electric power company, China), Hanxiang Wang, Jian Li, Zhengyong Huang (Chongqing University, China)*

2-3-23 Surface Discharge Behavior of PP/BN Nanocomposite considering HTS Device Application  
*B. X. Du, X. M. Pan, J. Li, M. Y. Wang, X. X. Kong, J. P. Jiang, M. Xiao(Tianjin University, China)*

2-3-24 Effects of Irradiation on Surface and Space Charge Behavior of Polyimide Film for Superconducting Magnet Insulation  
*M.Y. Wang, B.X. Du, J. Li, H.C. Liang, Z.L. Li, C.L. Han, R.R. Xu, Z.H. Hou (Tianjin University, China)*

2-3-25 Effect of Fullerene Nanoparticle on Tuning Trap Level Distribution of Fullerene/Polyethylene Nanocomposites  
*Chang Liu, Zhonglei Li, Boxue Du, Chenlei Han, Zhaohao Hou (Tianjin University, China)*

## **Session 4 Poster: Power Cable**

Tuesday, April 9<sup>th</sup>, 2019, 10:45 – 12:15

Venue: International Convention Hall, 1<sup>st</sup> F

Session Chairs: Kai Wu, Lin Yang

2-4-1 Modelling Charge Transport in a HVDC Cable using Different Softwares: from Fluid Models to Macroscopic Model  
*S. Le Roy (Laplace, CNRS and University of Toulouse, France), T.T.N. Vu (Electrical Engineering Department, Electric Power University, Hanoi, Vietnam), G. Teyssedre (Laplace, CNRS and University of Toulouse, France)*

2-4-2 The Electrical Properties and Processing Characteristic of The Cross-linked Polyethylene based Insulation for High-voltage Direct Current Cables  
*Weikang Li, Hongda Yan, Wenpeng Li, Chong Zhang, Fan Yu, Xiaoning Shi, Weijia Zhao (State key Laboratory of Advanced Transmission Technology, Global Energy Interconnection Research Institute, China)*

2-4-3 Low Density Polyethylene - Clay Nano Dielectric Prepared by Melt Extrusion Process: Dielectric and Thermal properties  
*Nageshwar Rao Burjupati, Kandiban R, Anju R.K, Ashwin Parthasarathy(Central Power Research Institute, India)*

2-4-4 Conductivity of HVDC Cable Insulation Materials: Case Study between XLPE Nanocomposite and Polymer Filled XLPE  
*Liang Cao, Lisheng Zhong, Yingge Li, Jinghui Gao, Guanghui Chen, Wenpeng Li (Xi'an Jiaotong University, China), Weikang Li, Chong Zhang (Global Energy Interconnection Research Institute Co., Ltd, China)*

- 2-4-5 Calculation and Restraining Method for Circulating Current of Single Core High Voltage Cable  
*Hongbao Zong, Qun Gao (Tianjin University, China), Rongliang Wang (State Grid Tianjin Electric Power Maintenance Company, China), Haoming Wang (Tianjin Electric Power Research Institute of State Grid Tianjin Electric Power Corporation, China), Yong Liu (Tianjin University, China)*
- 2-4-6 A Novel Method for Management of Thermal Loads in The EV Cable Based on Improved Thermal Conductivity of Insulation and Sheathing Materials  
*B. X. Du, Q. Wang, X. X. Kong, J. Li, M. Xiao, X. M. Pan (Key Laboratory of Smart Grid of Education Ministry, School of Electrical and Information Engineering, Tianjin University, China), W. B. Zhu (Electric Power Research Institute, China Southern Power Grid, China) J. P. Jiang, J. G. Su (Key Laboratory of Smart Grid of Education Ministry, School of Electrical and Information Engineering, Tianjin University, China),*
- 2-4-7 Mechanical Property Analysis, Simulation and Theoretical Calculation of Silicone Rubber Joint Assembled in HV Cable under Certain Circumstances  
*Jiangjing Cui, Wei Qiu, Shuntao Huang, Tingxi Sun, Zhihua Lu, Sheng Wang (Zhuhai Power Supply Bureau, Guangdong Power Grid Limited Liability Corporation, China), Feipeng Chen, Dong Yu, Xia Wang, Kai Wu (State Key Laboratory of Electric Insulation and Power Equipment, Xi'an Jiaotong University, China)*
- 2-4-8 Thermal-oxidative Aging Effected on Dielectric Properties of Polyolefin Used for Nuclear Cables Insulation  
*Jianxi Li (CGN-DELTA Testing Technology CO., LTD., China), Xiaohong Chi, Wenfeng Liu, Daonin Min, Shengtao Li (State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, China)*
- 2-4-9 Study on Ablation between Metal Sheath and Buffer Layer of High Voltage XLPE Insulated Power Cable  
*Lei Jiang, Yue Xin, Wenbo Yan, Xiyuan Zhao, Ruifeng Yao, Zhuoyuan Shen, Jinghui Gao, Lisheng Zhong (State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, China), Detlef F. Wald (Eifelkabel consultant Company, Switzerland), Zhigang Ren (State Grid Beijing Electric Power Research Institute, China)*
- 2-4-10 A Novel Variable-frequency Resonant System for Partial Discharge Detection of XLPE Cables  
*Yuxin Lu (School of Electrical Engineering, Xi'an Jiaotong University, China), Lu Pu, Xuefeng Zhao (State Grid Shaanxi Electric Power Research Institute, China), Haochen Wang, Tian Li, Hangwei Zhang, Penglei Xu (School of Electrical Engineering, Xi'an Jiaotong University, China)*
- 2-4-11 The Application of System Identification Method in Calculating The Transient Temperature Rise of Power Cables  
*Zhoufei Yao, Chenzhao Fu, Honglei Li (State Grid Shanghai Electrical Power Research Institute, China), Jialei Hu (Shanghai Jiaotong University, China)*
- 2-4-12 Effects of Temperature on Space Charge and DC Conductivity Behaviors in PP/ULDPE/Graphene Nanocomposite for HVDC Cable Insulation  
*Z. H. Hou, B. X. Du, Z. L. Li, J. Li (Key Laboratory of Smart Grid of Education Ministry, School*

*of Electrical and Information Engineering, China), H. M. Wang, S.C. Fang (Tianjin Electric Power Research Institute of State Grid Tianjin Electric Power Company, China)*

- 2-4-13 Integrated Detection of Temperature and Partial Discharge on Cables Based on FBG  
*Xutao Wu (Electric Power Research Institute of State Grid Ningxia Electric Power Company Limited, China), Ridong Li (State Key Laboratory of Alternate Electrical Power System with Renewable Energy Sources, North China Electric Power University, China), Hui Ni, Pei Ding, Xiuguang Li, Xiu Zhou (Electric Power Research Institute of State Grid Ningxia Electric Power Company Limited, China), Yangchun Cheng, Haibo Yu (State Key Laboratory of Alternate Electrical Power System with Renewable Energy Sources, North China Electric Power University, China)*
- 2-4-14 Effect of ZnO on Morphology and Breakdown Characteristics of Polyethylene  
*Xiaohong Zhang, Dingping Zhang, Xia Li, Junguo Gao, Haitao Hu (Key Laboratory of Engineering Dielectrics and Its Application Ministry of Education, Harbin University of Science and Technology, China)*
- 2-4-15 Analysis of Transient Characteristics in the 110kV Cable Joint System during Switch Closing  
*Huanan Wang, Xia Wang, Dong Yu, Zihang Shu, Kai Wu (State Key Laboratory of Electric Insulation and Power Equipment, Xi'an Jiaotong University, China)*
- 2-4-16 Onshore Simulation Test Setup for Temperature and Strain Sensing of Submarine Cable based on BOTDA  
*Huang Xiaowei (Guangzhou Bureau, EHV Transmission Company of China Southern Power Grid Co., Ltd., China), Kai Yao, Guanshu Sun (School of Electrical Engineering, Xi'an Jiaotong University, China), Jing Zhou, Yikang Chen, Qiang Guo, Jun Chen (Guangzhou Bureau, EHV Transmission Company of China Southern Power Grid Co., Ltd., China), Yu Chen (School of Electrical Engineering, Xi'an Jiaotong University, China)*
- 2-4-17 The Suitability Analyses of Sheath Voltage Limiters for HV Power Cable Transmission Lines  
*Dai Cao, Xuezhong Liu (State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, China), Xianbo Deng (China Electric Power Research Institute, China)*
- 2-4-18 Properties of Water Tree Growing in XLPE and Composites  
*Qingyue Yu, Xiufeng Li, Peng Zhang (Shandong University of Technology, China), Peijie Yang, Youfu Chen (Nanjing Zhongchao New Materials CO., LTD, China)*
- 2-4-19 Influence of Voltage Stabilizer on DC Conductivity and Space Charge Characteristics in XLPE for HVDC Cable Application  
*C. L. Han, B. X. Du, J. Li, Z. H. Hou, R. R. Xu, M. Y. Wang (Tianjin University, China)*

## **Session 5 Poster: Transformer and External Insulation**

Tuesday, April 9<sup>th</sup>, 10:45 – 12:15 (Paper 2-5-1 to 2-5-21)

Venue: International Convention Hall, 1<sup>st</sup> F

Session Chairs: Guanjun Zhang, Chuanyang Li



Wednesday, April 10<sup>th</sup>, 14:00 – 15:45 (Paper 2-5-22 to 2-5-42)

Venue: International Convention Hall, 1<sup>st</sup> F

Session Chairs: Reimund Gerhard, Fuzeng Zhang

- 2-5-1 Influence of Non-Soluble Contamination Microscopic Properties on Hydrophobicity Transfer on Silicone Rubber Surface of Composite Insulator  
*Xinzhe Yu, Jun Zhou, Bo Liu, Yueneng Xu (China Electric Power Research Institute, China), Xiaolei Yang (State Grid Sichuan Electric Power Company, China), Qiaogen Zhang (Xi'an Jiaotong University, China)*
- 2-5-2 Damage Feature Extraction and Parameter Characterization of Large Generator Stator Insulation Based on Lamb Waves Detection Method  
*Zhifeng She, Ruihua Li, Haojie Gu, Bo Hu, Zhongya Mao (Tongji University, China)*
- 2-5-3 Experimental Study on Arcing Process of Vacuum Arc under Wan-Type Contacts  
*Bo Yuan, Li Zhao, Jiashuo Cui, Shixin Xiu, Quan Li (Xi'an Jiaotong University, China)*
- 2-5-4 Image Characteristic Extraction of Surface Phenomena for Flashover Monitoring of Ice-Covered Outdoor Insulator  
*Qiran Li, B. X. Du (Tianjin University, China), Masoud Farzaneh (Université du Québec à Chicoutimi, Canada)*
- 2-5-5 Characterization of the Fluorinated Surface Layer of the Alumina-filled Epoxy Insulator  
*Weijun Chen, Zhenlian An, Longkai Que, Wenjian Gao, Feihu Zheng, Yewen Zhang (Tongji University, China), Yong Yang, Xulei Liu, Fang Liu (Shandong Taikai Electric Insulation Co., Ltd., China), Zhuo zhang, Wei Yang, Zhaoliang Xing (Global Energy Interconnection Research Institute Co., Ltd., China)*
- 2-5-6 Analysis of Conductor Sag Change after Bare Overhead Conductor is Covered with Insulation Material  
*Jintao Jiang, Zhidong Jia, Xilin Wang, Shihao Wang, Changjian Yang (Tsinghua University, China)*
- 2-5-7 Simulation on Electrical Field Distribution of Polluted HVDC Wall Bushing  
*Shiyi Zhou, Ran Shi, Zehua W, Qingyu Wang, Zongren Peng (Xi'an Jiaotong University, China), Jianwei Cheng (Southern Electric Power Research Institute, China)*
- 2-5-8 Study on the Discharge Characteristic and Detection Method on the Faulty of Distribution Insulators  
*Lijun Zhou (China Electric Power Research Institute Co., Ltd, China) (Hefei University of Technology, China), Nianwen Xiang (Hefei University of Technology, China), Ye Tian (Electric Power Research Institute of State Grid Liaoning Electric Power Co., Ltd, China), Weijiang Chen (State Grid Corporation of China, China), Song Ling, Kai He (State Grid Anhui Electric Power Co., Ltd., China), Zhong Fu (Electric Power Research Institute of State Grid Anhui Electric Power Supply Co., Ltd, China)*

- 2-5-9 Measurement of Excess Current Accompanying Partial Discharge of Polymer Film in Tri-electrode system under Power Frequency Voltage  
*Ran Duan, Ming Ren, Tianxin Zhuang(Xi'an Jiaotong University,China)*
- 2-5-10 Study on Detection Method of Composite Insulator Ageing Based on Hyperspectral Technology  
*Runming Gao, Xueqin Zhang, Yujun Guo,Chao Fan, Yan Qiu, Yuansheng Li, Guangning Wu (Southwest Jiaotong University, China)*
- 2-5-11 Effect of Water Droplets on the Corona Discharge Characteristics of Composite Insulators in Arid Areas  
*Yu Li, Xueqin Zhang, Xinyu Tang, Peidong Li, Yuansheng Li, Yujun Guo, Guangning Wu (Southwest Jiaotong University, China), Song Gao (State Grid Jiangsu Electric Power Research Institute, China)*
- 2-5-12 Elemental Analysis of Aged Composite Insulators Based on Laser Induced Breakdown Spectroscopy  
*Yuansheng Li, Xueqin Zhang, Yujun Guo, Runmin Gao, Xinyu Tang, Yu Li, Guangning W (Southwest Jiaotong University, China)*
- 2-5-13 Development of Power Transmission Line Defects Diagnosis System for UAV Inspection Based on Binocular Depth Imaging Technology  
*Tianqi Mao, Xianwu Zeng, Shengfu Li(Guizhou Power Grid Corporation, China), Kai Huang, Lingran Ren, Chuance Wang, Yu Chen (Xi'an Jiaotong University, China), Min Zhang (Northwest University, China)*
- 2-5-14 Monitoring Technology of Lighting Scattered Current of Transmission Tower  
*Aidong Xu, Peng Li, Zhiming Wang, Zhibing Wu, Zhe Ming, Bing Tian (China Southern Power Grid, China), Licheng Li (China Southern Power Grid, China)*
- 2-5-15 Electric Field Distribution Calculation and Analysis of Composite Insulators Operating on Double Circuit Transposition Tower in 500kV Transmission Lines  
*Chenjun Guo, Hong Yu, Yi Ma (Yunnan Power Grid Co., Ltd. China), Lishuai Liu, Hongwei Mei, Liming Wang (Tsinghua University, Shenzhen, China)*
- 2-5-16 Calculation and Analysis on Mechanical Strength of 500kV Hollow Composite Insulator with Different Types of Grooves on the Surface of End Fitting  
*Haofeng Zhang (Graduate School at Shenzhen, Tsinghua University, China), Xiaoxing Wei (China Southern Power Grid, China)*
- 2-5-17 Dissolved Gas Analysis in Camellia Insulating Oil During Thermal Ageing Test  
*Lingyun Gu, Changkai Shi, Yan Wu, Xuefeng Bai (Beijing Key Laboratory of Distribution Transformer Energy-Saving Technology, China), Qiu Huang Han, Feipeng Wang, Kaizheng Wang, Chenmeng Xiang (Chongqing University, China)*
- 2-5-18 Feasibility Study on Detecting Glaze Icing Load of Composite Insulators by Using Fiber Bragg Grating  
*Jie Wei, Yanpeng Hao, Yuan Fu, Lin Yang (South China University of Technology, China), Jiulin Gan, Zhongmin Yang (South China University of Technology, China)*

- 2-5-19 Application of EP/SiC Coated Insulator in DC Gassolid Insulation System  
*H. C. Liang, B. X. Du, J. Li, C. Zhang, Z. H. Wang, Z. Y. Ran (Tianjin University, China), Z. Yin, Y. L. Cai (State Grid Tianjin Maintenance Company Hebei District, China)*
- 2-5-20 Effects of Air Humidity and Hanging Angle on Accumulation Characteristics of Pollution Particles on Anti-icing Polymer Insulators  
*Xianghuan Kong, Yong Liu, T. Han, Yu Gao, B. X. Du(Tianjin University, China)*
- 2-5-21 Study on Evaluation Method of Insulator Surface Contamination Level Based on LIBS Technology and PCA Algorithm  
*Yifan Liao, Fuzeng Zhang, Tingting Wang (China Southern Power Grid Co., Ltd, China), Yuansheng Li, Xueqin Zhang, Yujun Guo, Zhang Xiao, Yaozhen Wang (Southwest Jiaotong University, China)*
- 2-5-22 Simulation Study on the Influence of Electric Field on Contamination Accumulation Characteristics of Insulator  
*Hongwei Mei, Jiaxin Yang, Lanxin Li, Liming Wang (Graduate School at Shenzhen, Tsinghua University, China), Tingting Wang, Fuzeng Zhang, Yifan Liao (Electric Power Research Institute, CSG, China)*
- 2-5-23 Trap Distribution Dependent Charge Behavior of Fluorinated Oil-impregnated Paper under the Harmonic Superimposed DC Voltages  
*W.B. Zhu, B.X. Du, J.P. Jiang, J. Li, J.G. Su, X.X. Kong (Tianjin University, China)*
- 2-5-24 Investigation on Lightning Impulse Breakdown and Dissolved Gas Characteristics of the Novel Three-element Mixed Insulation Oil  
*Xin Chen, Jian Hao, Lijun Yang, Ruijin Liao, Dawei Feng (Chongqing University, China), Xiong Liu, Qian Wang (Chongqing Electric Power Research Institute, China)*
- 2-5-25 Effect of Frequency on Discharge Characteristics of Inter Layer Materials in HV-HF Transformers  
*Yikun Zhao, Guoqiang Zhang (Chinese Academy of Sciences, China)(University of Chinese Academy of Sciences, China), Runrui Guo, Kang Li (University of Chinese Academy of Sciences, China), Yu Han, Xuehai Gong (Global Energy Interconnection Research Institut , China)*
- 2-5-26 Breakdown Characteristics of Oil-paper Interface in Converter Transformer  
*Zhi Li, Kai Wu, Chuanhui Cheng, Chong Li (Xi'anJiaotongUniversity, China)*
- 2-5-27 Investigations of DC PD Characteristics Induced by Metal Particles in Flowing Transformer Oil  
*Xinyu Luo (Chongqing University, China) ,Ju Tang (Chongqing University, China)(Wuhan University, China), Cheng Pan (Wuhan University, China), Yongze Zhang (Chongqing University, China)*
- 2-5-28 Transformer Familial Defect Detection Method Based on SVM Improved by Apriori Algorithm—  
 —Based on Analysis of Dissolved Gases in Oil  
*Shiyong Li, Lijuan Zhang, Yan Shi, Junqiu Yang (Guizhou Power Grid CO., LTD, China), Hongru Zhang, Yang Yao, Kai Wang, Qingquan Li (Shandong University, China)*

- 2-5-29 A Conversion Method for Plate Distribution of AC Capacitor Bushing Core  
*Gengsheng Xie , Fuping Zhao , Qingyu Wang , Peng Liu , Zongren Peng (Xi'an Jiaotong University, China) , Lei Ke (NARI Group Corporation, China)*
- 2-5-30 Research on Transformer Fault Diagnosis Based on BP Neural Network Improved by Association Rules  
*Long Jiang, Shiyong Li, Chao Yang, Dejun Wang (Guizhou Power Grid CO., LTD, China), Yang Yao, Kai Wang, Hongru Zhang, Qingquan Li (Shandong University, China)*
- 2-5-31 The Imbalance-induced Resistive Heating Profiles Analysis for Low Voltage Transformers  
*Lurui Fang, Kang Ma (University of Bath, UK), Song Xiao (Southwest Communication University, China)*
- 2-5-32 Research on the Effect of Different Connection Test Methods on Frequency Response of Transformer Windings  
*Zhiming Wang, Licheng Li, Peng Li, Zhe Ming, Yang Cao, Zhibing Wu (China Southern Power Grid, China) , Aidong Xu (China Southern Power Grid, China)*
- 2-5-33 Test and Estimate Method for Moisture Content of Oil-immersed Transformer  
*Wenxiang Xue, Hui Wang, Shuyuan Wang (State Grid Jibei Electric Power Company, China), Jinghai Xie, Xiangyu Chen (Jibei Electric Power Economic Research Institute, China)*
- 2-5-34 Comparison Study of Voltage Error Characteristics of Three-phase Three -element Combined Transformer with Traditional and New Structure  
*Gang Liu (State Grid Sichuan Electric Power Corporation Metering Center, China)(Chongqing University, China), Xiaofu Xiong, Cong Liu, Jian Hao (Chongqing University, China), Kun Liu (State Grid Sichuan Electric Power Corporation Metering Center , China)*
- 2-5-35 Insulating and Aging Properties of Transformer Oil-based Nanofluids  
*Muhammad Rafiq (North China Electric Power University, China)(North China Electric Power University, China), Yuzhen Lv, (North China Electric Power University, China) (North China Electric Power University, China) , Chengrong Li (North China Electric Power University, China)(North China Electric Power University, China)*
- 2-5-36 Study on a Partial Discharge Detection Method for Transformers Adopting the End Shield as UHF Sensor  
*Xuanrui Zhang, Shanyuan Sun (Xi'an Jiaotong University, China), Yun Yang, Chao Gao (Electric Power Research Institute, CSG, China), Junhao Li (Xi'an Jiaotong University, China)*
- 2-5-37 Research on Partial Discharge Identification of Power Transformer Based on Chaotic Characteristics Extracted by G-P Algorithm  
*YuHang Fan, DingGe Chang, YanBo Wang, GuanJun Zhang (Xi'an Jiaotong University, China)*
- 2-5-38 Simulation of Neutral Point Overvoltage and Research on New Protection Measures for 220kV Transformer  
*XiuJuan Chen, Chao Xia (China Electric Power Research Institute, China), GuoXing Wu, Fan Zhang (Shenzhen Power Supply Bureau Co., Ltd., China), HuiZheng Ji, JianMin Wang (Tianjin Zedong Energy Polytron Technologies Co., Ltd., China), WeiDong Shi (China Electric Power*

*Research Institute, China), Long Chen (Shenzhen Power Supply Bureau Co., Ltd., China), TianTian Lu, Ting Lei, ZhaoHua Zhang (China Electric Power Research Institute, China)*

2-5-39 Winding Type Recognition through Supervised Machine Learning Using Frequency Response Analysis (FRA) Data

*Xiaozhou Mao, Zhongdong Wang (The University of Manchester, UK), Paul Jarman, Andrew Fieldsend-Roxborough (National GridCompany, UK)*

2-5-40 Interpretation of FRA Results through Low Frequency Transformer Modelling

*Bozhi Cheng, Peter Crossley, Zhongdong Wang (The University of Manchester, UK), Paul Jarman, Andrew Fieldsend-Roxborough (National GridCompany, UK)*

2-5-41 Study on the Influence of Harmonics on the Magnetic Leakage Field and Temperature Field of 500 kV Connected Transformer

*Zhiming Huang, Yifan Zhang, Yi Jing, Mingli Fu, Guoli Wang, Ran Zhuo (Electric Power Research Institute, CSG, China), Qiao Wang (South China University of Technology, China)*

2-5-42 Temperature Monitoring of Distribution Transformer Windings Based on Fiber Bragg Grating Array

*Li Wang (China Electric Power Research Institute, China), Qingjie Wang (State Grid Corporation of China, China), Weiqi Qin (North China Electric Power University, China), Tianming Liao (State Grid Shanghai Electric Power Company, China), Honglei Yang (China Electric Power Research Institute, China), Guoming Ma (North China Electric Power University, China)*

## **Session 6 Poster: GIS and Electric Apparatus**

Wednesday, April 10<sup>th</sup>, 14:00 – 15:45

Venue: International Convention Hall, 1<sup>st</sup> F

Session Chairs: Rongsheng Liu, Xin Lin

2-6-1 Detection and Diagnosis of Multiple-void Discharge Sources in On-site 550kV GIS Insulating Spacer

*Shao Xianjun, Li Feiran, Chen Xiaoxin, Wang Ziling, Mei Bingxiao, He Wenlin (Electric Power Research Institute of State Grid Zhejiang Electric Power CO., LTD, China)*

2-6-2 Electric Field Calculation and Structure Parameter Analysis of Dumbbell Type Tri-post Insulator

*Zehua Wu, Haoran Wang, Huidong Tian, Sijia Zhu, Shiyi Zhou, Ran Shi, Zongren Peng (Xi'an Jiaotong University, China)*

2-6-3 Study on Measurement CF<sub>4</sub> Gas Concentration in High Voltage Electrical Equipment by NDIR

*Zhang Shiling (Chongqing Electric Power Research Institute, China)*

2-6-4 Research on Circulating Current Characteristics and the Vibration Mechanism on the GIS Enclosure

*Xuejing Liao, Xuhui Su, Chengjun Ren (State Grid Nanchong Power Supply Company, China),*

*Liang He, Dengwei Ding (Tsinghua Sichuan Energy Internet Research Institute ,China), Dianbo Zhou (State Grid Sichuan Electric Power Research Institute ,China)*

- 2-6-5 Influence of Contacts Diameter on the Vacuum Arc Characteristics of Spiral-type Contacts  
*M. R. Li, Y. Z. Zhang, T. Liu, S. X. Xiu, G. Liu (Xi'an Jiaotong University , China)*
- 2-6-6 Partial Discharge Detection and Structure Optimization of a Bushing of 10 kV Switchgear Cabinet  
*Deng Zhixiang, Cai Muliang, Wang Huayun, Fan Ruixiang, Zheng Shujiang, Hao Yu (State Grid Jiangxi Electric Power Research Institute, China)*
- 2-6-7 Analysis of SF6 Solid Decomposition Products after Breaking Tests  
*Xiao Wang, Yuyou Long, Shixin Xiu, Zepeng Chen (Xi'an Jiaotong University, China), Zhiheng Sun (Southern Power Supply Company, China)*
- 2-6-8 Interfacial Stress Between Conductor and Insulation Material of GIS/ GIL Spacer Used in UHV  
*AN Yuan, WANG Chuang, JIA Jing, SUN Qing (Institute of Water Resources and hydro-electric Engineering, Xi'an University of Technology ,China), PENG Zongren (State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, China)*
- 2-6-9 Optimized Design of Contour Shape for Central Insert of Basin-type Insulators Based on Genetic Algorithms Transformer  
*Shen Zikui, Jia Zhidong (Graduate School at Shenzhen, Tsinghua University, China), Zhao Xiaobo (Shandong Taikai High-voltage Switchgear Co., Ltd, China)*
- 2-6-10 Partial Discharge Behavior of Epoxy/paper Insulated Tubular Busbars with Artificial Defects  
*Chuang Zhang, Liangbin Ai, Penghu Li, Shihang Wang, Jianying Li, Haiyun Jin (Xi ' an Jiaotong University, China ), Zhaoliang Xing (Global Energy Interconnection Research Institute Co., Ltd.,China )*
- 2-6-11 Application Research on General Equipment of 35-750kV Substation of State Grid Corporation in China  
*Yanmiao He (China Electric Power Research Institute Co., Ltd., China), Yanxia Guo (State Grid Corporation of China, China), Jiaoting Kuang, Guoyao Li (China Energy Construction Group Zhejiang Electric Power Design Institute Co., Ltd, China), Chunfeng Wang, Zixuan Ding (China Energy Construction Group Jiangsu Electric Power Design Institute Co., Ltd, China), Yin Zhan (China Power Construction Group Fujian Electric Power Survey and Design Institute Co., Ltd., China), Lingling Tan (Shandong Electric Power Engineering Consulting Institute Co., Ltd., China)*
- 2-6-12 A Flexible Sandwich Structure Strain Sensor Based on Silver Nanowires and PDMS with Excellent Sensing Capability  
*Z.H. Yang, Y. Zhao, Z.J. Wu, D.H. Wang, J. Liu, D.W. Jiang (Harbin University of Science and Technology, China), N. Guo, J. G. Gao (Northeast Forestry University, China)*
- 2-6-13 A FEM Based Estimation Method of Thermal Circuit Model for High-voltage Press-pack IGBT Modules  
*Chenshuo Liu, Lingyu Zhu, Zhuangzhuang Zhang, Liang Pan, Cao Zhan, Shiyang Chen, Shengchang Ji, (Xi'an Jiaotong University, China)*

- 2-6-14 Investigation on the Spacer Flashover in Humid SF6 under Different Electrical Stresses  
*A.P. Purnomoadi, G. Supriyadi, B.S. Munir (PLN Research Institute, Indonesia), A. Rodrigo Mor, J.J. Smit (Delft University of Technology, the Netherlands)*
- 2-6-15 Risk Assessment Model for GIS Operating under Tropical Conditions  
*A.P. Purnomoadi (PLN Research Institute Jakarta, Indonesia), J.J. Smit (EEMCS Faculty Delft University of Technology Delft, The Netherlands), D.S. Rahmani (PLN East Java Transmission Unit Jakarta, Indonesia), G. Supriyadi (PLN Research Institute Jakarta, Indonesia), A. Rodrigo Mor (EEMCS Faculty Delft University of Technology Delft, The Netherlands)*
- 2-6-16 Radiation Induced Leakage Current of HfO<sub>2</sub>-based MOS Capacitors under 60Co Gamma Ray  
*Man Ding, Yitong Wu (Hohai University, China)*
- 2-6-17 Effect of Pre-field on the Dielectric Properties of BaTiO<sub>3</sub>-based Equalizing Ceramics Capacitors of Surge Arrester  
*Xia Zhao (China Electric Power Research Institute, China), Wei Chen (Xi'an Jiaotong University, China)*
- 2-6-18 Experimental Study on Relationship between Breakdown Temperature and Decomposition Products of SF<sub>6</sub> gas  
*Qiang Yao, Ni Qiu, Yulong Miao, Yubin Hou (State Grid Chongqing Electric Power Co. Electric Power Research Institute, China), Fuping Zeng, Zhaofeng Wan (Wuhan University, China)*
- 2-6-19 Design of a New Miniature Microwave Power Transmission Rectifier  
*Li Peng, Xu Aidong, Wang Zhiming, Wu Zhibing (China Southern Power Grid, China), Li Licheng (China Southern Power Grid, China)*
- 2-6-20 Mechanism of Electric Field Control at the Interface of the Central Conductor and Insulation Basin of UHV GIS Spacer  
*Chuang Wang, Lang Zhao, Deyi Wang, JingJia, Qing Sun, Yue Bu (Xi'an University of Technology, china), Zongren Peng (Xi'an Jiaotong University, China)*
- 2-6-21 Dielectric Characteristics of the ±1100kV UHVDC Wall Bushing with SF<sub>6</sub> Gas Insulation  
*Zhang Shiling (Chongqing Electric Power Research Institute, China)*
- 2-6-22 Application of Surface Functionally Graded Materials for Solid Insulator in Gas Insulated Power Apparatus  
*B. X. Du, Z. H. Wang, J. Li\*, H. C. Liang, Z. Y. Ran, H. L. Liu and H. Yao (Tianjin University, China)*
- 2-6-23 The Influence of Sampling Container, Detection Process and Equipment Structure on Detection Results of SF<sub>6</sub> Gas Decomposition Products  
*Miao Yulong, Yao Qiang, Qiu Ni (State Grid Chongqing Electricity Company Electric Power Research Institute, china), Tang Ju, Zeng Fuping, Zhao Zhiqiang (Wuhan University, china)*
- 2-6-24 Research on the key technical parameters of the 10kV disconnecter on surge arrester  
*Cai Muliang, Liu Changqing, Wang Yu (Jiangxi Electric Power Design Institute, China), Zhang*

*Tao, Deng Yeqiang, Wang Huayun, Zheng Shujiang, Deng Zhixiang, Liu Bei (Wuhan University, China)*

2-6-25 The Study of a Secondary Ferroresonance Elimination Method Based on Combined Detection of the Zero-sequence Voltage and Potential Transformer Current

*Hongrui Jia, Xuezhong Liu, Shijian Tian (Xi'an Jiaotong University, China), Zhilei Zhang (Yunnan Power Grid Corporation Honghe Power Supply Bureau, China), Hongwen Liu (Yunnan Electric Power Research Institute, China)*

2-6-26 Effects of Plasma Etching on Insulating Performance of Epoxy Resin Considered for GIL Insulator

*H. L. Liu, B. X. Du, J. Li, Z. H. Wang, H. C. Liang, Z. Y. Ran, H. L. Sun (Tianjin University, China), M. L. Fu, B. Luo, S. Hou, Y. F. Liao, T. T. Wang, W. B. Zhu (China South Power Grid, China)*

2-6-27 Method of Determining Compression Set for GIS Seal Ring (O-ring) Based on Directional Section Diameter

*Zhimin Zhang, Yanpeng Hao, Jiahao Peng, Lin Yang, Licheng Li (South China University of Technology, china), Chao Gao (China Southern Power Grid, China)*

2-6-28 Ultrasonic Velocity Measurement of Epoxy Composite for GIS Based on Through-transmission Method

*Zhouyiao Zou, Lin Yang, Fangyuan Tian, Yao Zheng, Weiming He, Yanpeng Hao, Licheng Li (South China University of Technology, China)*