2023 International Workshop on Advanced Patterning Solutions (IWAPS 2023)

Lishui, Zhejiang Province, China
25-26 October 2023

IEEE

IEEE Catalog Number: CFP23Y70-POD
ISBN: 979-8-3503-4455-4

Copyright © 2023 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: CFP23Y70-POD
ISBN (Print-On-Demand): 979-8-3503-4455-4
ISBN (Online): 979-8-3503-4454-7

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
Web: www.proceedings.com

Table of Contents

DESIGN OF A LARGE FIELD OF VIEW HIGH NUMERICAL APERTURE EXTREME ULTRAVIOLET LITHOGRAPHY ILLUMINATION SYSTEM 1
Xinyi Zhang, Yuqing Chen, Yanbei Nan, Yanqiu Li

IMPLEMENTING AN OPC-BASED ANALYSIS METHOD FOR EVALUATING THE CAPABILITIES OF PHOTORESIST AND IDENTIFYING HOT SPOTS 6
XiaoLong Wang, XueMei Zhao, BiCheng Chen, Chen Shen, QunLiang Ni, NanNan Zhang, ZhiMang Shao, WenHui Chen, LianFeng Guo, QingFeng Xue

SELECTING TEST PATTERNS WITH THE POOL-BASED SAMPLING METHOD 10
Peng Xu, Juan Wei, Jinlai Liu, Jingkang Qin, Song Sun, Qingchen Cao, Jiangliu Shi

AN ALGORITHM TO REDUCE COLORING CONFLICTS FOR TRIPLE PATTERNING 13
Yiyao Zhang, Qiang Zhang, Tao Xia

A TRANSMISSIVE SPECTRAL PURITY FILTER FOR SUPPRESSING INFRARED RADIATION IN EXTREME ULTRAVIOLET LITHOGRAPHY SOURCE 16
Haoxin Leng, Changqing Xie

EXTENDING DRSEM INSPECTION CAPACITIES AND APPLICATIONS WITH THE INTRODUCTION OF D2DB TECHNOLOGY 19
Hao Yu, Changlian Yan, Rongjia Zhang, Yuan Gan,Nuo Ding, Ming Ding, Zhao Chen, Xiaojun Luo, Junhai Jiang, Zongchang Yu, ChunYing Han

FAST IMAGING MODEL OF PERIODIC PATTERNS IN PLASMONIC LITHOGRAPHY 23
Huwen Ding , Yayi Wei

A NOVEL MULTI-SCALE FEATURE LEARNING-BASED RESIDUAL NETWORK IMPROVES SEMICONDUCTOR WAFER DEFECT CLASSIFICATION ACCURACY 28
Can Ma, Yiming Yao, Luyang Jie, Lilei Hu

DEMONSTRATION OF 420GHZ HIGHLY SCALED INALN/GAN HEMTS BY ELECTRON BEAM LITHOGRAPHY 33
Jiaheng He, Zhe Cheng, Chengcheng Li, Shujie Xie, Xuankun Wu, Lian Zhang, Chang Wu, Yun Zhang

RIGOROUS SIMULATION FOR IMPACT OF SELF-ALIGNED MULTIPLE PATTERNING ON ALIGNMENT 36
Mingyi Yao, Yuejing Qi, Guangying Zhou, Liang Li , Miao Jiang, Elly Shi

A NOVEL FEEDFORWARD AND FEEDBACK METHOD FOR OVERLAY CONTROL 39
Guoping Liu, Yinsheng Yu, Chi Zhang, Hongwen Zhao, Wenzhan Zhou, Yu Zhang

METROLOGY CHALLENGE FOR MONITORING POST CMP PATTERN THROUGH CD SEM 42
Gang Wang, Yuyang Bian, Biqiu Liu, Cong Zhang, Wenzhan Zhou

AN OPTIMIZATION METHOD TO IMPROVE ACCURACY OF THE WAVEFRONT ABERRATION MEASUREMENT TECHNIQUE BASED ON PRINCIPAL COMPONENT ANALYSIS OF AERIAL IMAGES 46
Tong Tong, Dongchao Pan, Yipeng Jiang, Xiangzhao Wang, Sikun Li

EXPLORATION CHARGE EFFECT AND WAFER BACKSIDE MATERIALS CORRELATION TO DIAMOND-LIKE CARBON WAFER TABLE DEGRADATION 50
Zhaojie Song, Kai Ding, Shancheng Hu, Stone Zhao, Leslie Zhang, Shifeng Jiang

METROLOGY EVALUATION INDICATORS OF GATE LINE END PATTERNING OF SRAM BY USING SEM CONTOUR EXTRACTION 53
Rui Wang, Kun Ren, Dawei Gao, Yongyu Wu, Xiaoci Li, Qijian Wan, Sihang Zou , Chunshan Du,

A MASKED AUTOENCODER-BASED APPROACH FOR DEFECT CLASSIFICATION IN SEMICONDUCTOR MANUFACTURING 56
Hu Lu, Jiwei Shen, Botong Zhao, Pengjie Lou, Wenzhan Zhou, Kan Zhou, Xintong Zhao, Shujing Lyu, Yue Lu

NANOSHEET COUNT OPTIMIZATION STRATEGY OF COMPLEMENTARY FET (CFET) SCALING BEYOND 2 NM FROM DEVICE TO CIRCUIT 60
Hao He,Shixin Li,Yanna Luo,Haoqing Xu,Huaxiang Yin,Zhenhua Wu

APPLICATION IN LITHOGRAPHY INSPECTION OF PHASE BASIC IMAGE REGISTRATION ALGORITHM 64
Steven Zeng

LINE EDGE ROUGHNESS ANALYSIS AND SIMULATION AT ADVANCED LITHO PROCESS 68
Yufei Sha, Jiahao Xi, Liang Li, Miao Jiang, Di Liang, Ran Zhang, Ganlin Song, Enqiang Tian, Xiuyan Cheng, Futian Wang, Cuixiang Wang, Guangying Zhou, Mingyi Yao, Jiangliu Shi

THEORETICAL REVIEW OF A NEW APPROACH OF LITHOGRAPHY AT NM RESOLUTION 71
JianGuang Xian, FuWei Zhan

APPLICATION OF GENETIC ALGORITHM TO SOLVING BETTER SRAF RULES 75
Xuan Li, Kun Ren, Dawei Gao, Yongyu Wu, Bo Pang, Sihang Zou, Zhenguo Tian

PHOTOLITHOGRAPHY HOTSPOT DETECTION BASED ON DEEP LEARNING LHD MODEL 79
Xiaolong Jiang, Kun Ren, Zebang Lin, Dawei Gao, Yongyu Wu, Yadong Jin, Zhengguo Tian, Sihang Zou, Chenwei Sun, Xinyi Hu, Qijian Wan, Chunshan Du

SIMULATION STUDY ON THE ROBUSTNESS OF POLAR MARK FOR INCIDENT LIGHT POLARIZATION STATES 84
Guangying Zhou, Yuejing Qi, Mingyi Yao, Liang Li, Miao Jiang, Jiangliu Shi

TEST PATTERN SAMPLING METHODOLOGY FOR MODEL TUNING EFFICIENCY AND ROBUSTNESS IMPROVEMENT 87
Lingxue Yang, Kun Ren, Dawei Gao, Yongyu Wu, Xinjiang Zhou, Chenwei Sun, Zhengguo Tian

AN APPROACH TO EXTRACTING SRAF RULES FROM INVERSE LITHOGRAPHY TECHNOLOGY RESULTS 91
Yao Jin, Kun Ren, Dawei Gao, Yongyu Wu, Zebang Lin, Xuan Li, Xuan Zhao, Xutao Chen, Sihang Zou, Zhengguo Tian, Chenwei Sun

LITHOGRAPHIC STEPPING TRAJECTORY PLANNING FOR RESIDUAL VIBRATION SUPPRESSION: AN ASYMMETRIC S-CURVE METHOD 95
Yue Dong, Yu Wan, Shuo Song,Li Li

STUDY ON THE INFLUENCE OF SPOT SIZES ON OPTICAL CRITICAL DIMENSION MEASUREMENT 100
Xiangyu Ma, Langfeng Wen, Boqu He, Yanzhong Ma

AN OPTICAL CRITICAL DIMENSION (OCD) STUDY WITH STANDARD STRUCTURES 103
Qi Wang, Qiang Wu, Xianhe Liu, Yanli Li

SOLUTIONS TO CALIBRATION ERRORS OF OPC MODELS FOR SPECIAL PATTERN BELOW 40 NM NODES 107
Kang Wang , ZhaoLong Luo , Pan Lv

A RIGOROUS-SIMULATION-DRIVEN OPC SOLUTION WAS BUILT BEFORE OBTAINING REAL WAFER DATA 110
Xiaodong Meng, Cai Chen, Edward Li, Lei Chen, Zilong Wang, Liang Zhu

THE ULTIMATE STEP TO PREDICT YIELD IMPACT FROM MASK BY LITHO PRINTABILITY REVIEW 113
Ching Shu Lo, Da Quan Yu, Chin Kuei Chang, Maohua Ren

AN INNOVATIVE LITHOGRAPHY PROCESS WINDOW DECISION BASED ON AGGREGATION OF MULTI MACHINE LEARNING APPROCHES 117
Kan Zhou, Xintong Zhao , Wenzhan Zhou, Jiwei Shen, Botong Zhao, Hu Lu

CONTACT HOLE MULTIPLICATION BY DIRECTED SELF-ASSEMBLY OF BLOCK COPOLYMER WITH HOMOPOLYMER-BLENDING 122
Zhiyong Wu, Qingshu Dong, Jiacheng Luo, Kangrui Yuan, Zili Li, Yadong Liu, Shengxiang Ji, Weihua Li, Yan Zhang, Shisheng Xiong

THE RATIONAL PHOTOMASK LAYOUT DESIGN OF VIAS FOR APPLICATION IN DOUBLE PATTERNING UV PHOTOLITHOGRAPHY 126
Mei Dou, Xiaobin Xu, Shisheng Xiong

ULTRA-THIN FILM METROLOGY TECHNIQUE: GRAZING INCIDENT X-RAY FLUORESCENCE 130
Yinqiao Feng, Yuxiang Huang, Ronghui Luo, Zhijun Chen, Xujun Li, Trina Wong, Qiang Fan, Feng Hong, Athena Chang

IMPROVE PHOTOMASK WRITING ERROR USING REGISTRATION CORRECTION （REGC） TECHNOLOGY 133
Yilei Zeng,Levi Tang,Yingjie Wang,Kun Chen, Adam Liu, Claire Zhang

INVESTIGATION OF MULTIPLE FEEDFORWARD MODES FOR ON PRODUCT OVERLAY CONTROL 137
Chi Zhang, Yongcun Bao, Guoping Liu, Guanqiang Lin, Chongxing Li, Hongwen Zhao

NEW STRATEGY TO IMPROVE THE MEASUREMENT ACCURACY OF ASYMMETRICAL MARK CAUSED BY PROCESS 140
Yongcun Bao, Chi Zhang, Guanqiang Lin, Chunjie Zheng, Longkang Yang, Hongwen Zhao

FEATURE POINT-BASED PROXIMITY EFFECT CORRECTION OF PATTERNS 143
Wenhao Wang, Kangpeng Huang, Siyu Feng, Zhensheng Zhang, Xuefeng Song, Dapeng Yu

A CURVILINEAR OPC WORKFLOW FOR HIGHLY REPETITIVE STRUCTURES AND HIGH ASPECT RATIO PATTERNS 147
Xing Gao, Ken Chen, Xiaomeng Li, Xuan Zhao, Xima Zhang, Cynthia Zhu, Keeho Kim

AN EFFICIENT TRANSFORMER-BASED APPROACH FOR DUV LITHOGRAPHY SEM IMAGE DENOISING 151
Jiwei Shen, Botong Zhao, Hu Lu, Pengjie Lou, Wenzhan Zhou, Kan Zhou, Xintong Zhao, Shujing Lyu, Yue Lu

PIX2PIXHD-BASED GENERATION OF SEM IMAGE IN THE ETCH DOMAIN BY SEM IMAGE OF LITHO DOMAIN 155
Botong Zhao, Jiwei Shen, Hu Lu, Pengjie Lou, Wenzhan Zhou, Kan Zhou, Xintong Zhao, Shujing Lyu, Yue Lu

BOE-ZISIM: A DESIGN-TECHNOLOGY-MANUFACTURING CO-OPTIMIZATION PLATFORM 158
Nan Liu, Zhizhao Zhang, Shantao Chen, Lisong Dong, Hong Wang