

## LETTERS

### **Passivation of oxide traps in gallium arsenide (semiconductor) metal-oxide-semiconductor capacitor with high-k dielectric by using fluorine incorporation**

Lining Liu, Hoi Wai Choi, Pui To Lai and Jingping Xu

J. Vac. Sci. Technol. B **33**, 050601 (2015); <http://dx.doi.org/10.1116/1.4927483>

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### **Field emission characteristics of pristine and lithium-doped boron nanotubes: A theoretical study**

Shunfu Xu, Weihui Liu, Ziliang Zhu, Yan Meng, Jiasheng Wang, Chun Li and Guang Yuan

J. Vac. Sci. Technol. B **33**, 050602 (2015); <http://dx.doi.org/10.1116/1.4928416>

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### **TiO<sub>2</sub> membrane high-contrast grating reflectors for vertical-cavity light-emitters in the visible wavelength regime**

Ehsan Hashemi, Jörgen Bengtsson, Johan S. Gustavsson, Stefan Carlsson, Georg Rossbach and Åsa Haglund

J. Vac. Sci. Technol. B **33**, 050603 (2015); <http://dx.doi.org/10.1116/1.4929416>

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### **Thickness-dependent mobility in tetracene thin-film field-effect-transistors**

Jun Shi, De-Tong Jiang, John R. Dutcher and Xiao-Rong Qin

J. Vac. Sci. Technol. B **33**, 050604 (2015); <http://dx.doi.org/10.1116/1.4931034>

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## ELECTRONIC & OPTOELECTRONIC MATERIALS, DEVICES & PROCESSING

### **Flexible nonvolatile memory transistors using indium gallium zinc oxide-channel and ferroelectric polymer poly(vinylidene fluoride-co-trifluoroethylene) fabricated on elastomer substrate**

Soon-Won Jung, Jae Bon Koo, Chan Woo Park, Bock Soon Na, Ji-Young Oh, Sang Seok Lee and Kyung-Wan Koo

J. Vac. Sci. Technol. B **33**, 051201 (2015); <http://dx.doi.org/10.1116/1.4927367>

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### **Pathway to achieving circular InAs quantum dots directly on (100) InP and to tuning their emission wavelengths toward 1.55 $\mu\text{m}$**

Richard P. Leavitt and Christopher J. K. Richardson

J. Vac. Sci. Technol. B **33**, 051202 (2015); <http://dx.doi.org/10.1116/1.4927199>

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### **Channel temperature measurements of In<sub>x</sub>Al<sub>1-x</sub>N/GaN high electron mobility transistors on Si(111) using optical spectroscopy**

Lwin Min Kyaw, Lakshmi Kanta Bera, Thirumaleshwara N. Bhat, Yi Liu, Hui Ru Tan, Surani

Bin Dolmanan, Eng Fong Chor and Sudhiranjan Tripathy

J. Vac. Sci. Technol. B **33**, 051203 (2015); <http://dx.doi.org/10.1116/1.4927366>

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**Nonlinear and complementary resistive switching behaviors of Au/Ti/TaO<sub>x</sub>/TiN devices dependent on Ti thicknesses**

Heeyoung Jeon, Jingyu Park, Hyunjung Kim, Honggi Kim, Woochool Jang, Hyoseok Song and Hyeongtag Jeon

J. Vac. Sci. Technol. B **33**, 051204 (2015); <http://dx.doi.org/10.1116/1.4927368>

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**Effect of the multiarray chip structure on the optical performance of GaN-based light emitting diodes**

Gyu-Jae Jeong, Ho-Dol Yoo, Kyoung-Kook Kim and Sung-Nam Lee

J. Vac. Sci. Technol. B **33**, 051205 (2015); <http://dx.doi.org/10.1116/1.4927370>

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**Properties of epitaxial barium titanate thin films using a highly volatile Ba(hfa)<sub>2</sub> triglyme precursor**

Young Kyu Jeong and Bruce W. Wessels

J. Vac. Sci. Technol. B **33**, 051206 (2015); <http://dx.doi.org/10.1116/1.4927380>

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**Focused-ion beam patterning of organolead trihalide perovskite for subwavelength grating nanophotonic applications**

Mohd Sharizal Alias, Ibrahim Dursun, Dong Shi, Makhsud Ismatboevich Saidaminov, Elhadj Marwane Diallo, Davide Priante, Tien Khee Ng, Osman Mohammed Bakr and Boon Siew Ooi

J. Vac. Sci. Technol. B **33**, 051207 (2015); <http://dx.doi.org/10.1116/1.4927542>

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**Effect of proton irradiation energy on AlGaIn/GaN metal-oxide semiconductor high electron mobility transistors**

Shihyun Ahn, Chen Dong, Weidi Zhu, Byung-Jae Kim, Ya-Hsi Hwang, Fan Ren, Stephen J. Pearton, Gwangseok Yang, Jihyun Kim, Erin Patrick, Brian Tracy, David J. Smith and Ivan I. Kravchenko

J. Vac. Sci. Technol. B **33**, 051208 (2015); <http://dx.doi.org/10.1116/1.4928730>

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**Device characteristics comparisons for the InGaZnO thin film transistors fabricated on two-type surfaces of the plastic poly(ethylene naphthalate) substrates with hybrid barrier layers**

Min-Ji Park, Da-Jeong Yun, Min-Ki Ryu, Jong-Heon Yang, Jae-Eun Pi, Oh-Sang Kwon, Gi Heon Kim, Chi-Sun Hwang and Sung-Min Yoon

J. Vac. Sci. Technol. B **33**, 051209 (2015); <http://dx.doi.org/10.1116/1.4929414>

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**Fabrication of low grass, smooth sidewall InGaAsP by methane–hydrogen inductively coupled plasma RIE through a metal lift-off mask patterned by e-beam lithography**

Viswas Sadasivan, Shikha Dagar and Utpal Das

J. Vac. Sci. Technol. B **33**, 051210 (2015); <http://dx.doi.org/10.1116/1.4929437>

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**Detection of dead layers and defects in polycrystalline Cu<sub>2</sub>O thin-film transistors by x-ray reflectivity and photoresponse spectroscopy analyses**

Fan-Yong Ran, Hidenori Hiramatsu, Hideo Hosono, Toshio Kamiya and Masataka Taniguti

J. Vac. Sci. Technol. B **33**, 051211 (2015); <http://dx.doi.org/10.1116/1.4929445>

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**Theoretical analysis of proton irradiation effects on AlGaIn/GaN high-electron-mobility transistors**

Ling Lv, Xiaohua Ma, He Xi, Linyue Liu, Yanrong Cao, Jincheng Zhang, Hengsheng Shan and Yue Hao

J. Vac. Sci. Technol. B **33**, 051212 (2015); <http://dx.doi.org/10.1116/1.4929544>

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**Fabrication of a planar light source utilizing monoalkali antimonide photocathodes as emitters**

Hyo-Soo Jeong, Kris Keller and Brad Culkin

J. Vac. Sci. Technol. B **33**, 051213 (2015); <http://dx.doi.org/10.1116/1.4930301>

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**Density functional theory studies on Cs activation mechanism between GaN (0001) and Al<sub>0.25</sub>Ga<sub>0.75</sub>N (0001) surface**

Yang Shen, Liang Chen, Yanyan Dong, Shuqin Zhang, Sunan Xu and Yunsheng Qian

J. Vac. Sci. Technol. B **33**, 051214 (2015); <http://dx.doi.org/10.1116/1.4930313>

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**Effects of 340 keV proton irradiation on InGaIn/GaN blue light-emitting diodes**

Byung-Jae Kim, Ya-Hsi Hwang, Shihyun Ahn, Fan Ren, Stephen J. Pearton, Jihyun Kim and Tae Sung Jang

J. Vac. Sci. Technol. B **33**, 051215 (2015); <http://dx.doi.org/10.1116/1.4930297>

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**Effect of Al incorporation amount upon the resistive-switching characteristics for nonvolatile memory devices using Al-doped ZnO semiconductors**

Won-Ho Lee, Eom-Ji Kim and Sung-Min Yoon

J. Vac. Sci. Technol. B **33**, 051216 (2015); <http://dx.doi.org/10.1116/1.4930896>

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**Co-implantation of Al<sup>+</sup>, P<sup>+</sup>, and S<sup>+</sup> with Si<sup>+</sup> implants into In<sub>0.53</sub>Ga<sub>0.47</sub>As**

Aaron G. Lind, Henry L. Aldridge Jr., Kevin S. Jones and Christopher Hatem  
J. Vac. Sci. Technol. B **33**, 051217 (2015); <http://dx.doi.org/10.1116/1.4931030>

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**Band offsets in Sc<sub>2</sub>O<sub>3</sub>/ZnO heterostructures deposited by RF magnetron sputtering**

David C. Hays, Brent P. Gila, Stephen J. Pearton, Byung-Jae Kim, Fan Ren and Tae Sung Jang

J. Vac. Sci. Technol. B **33**, 051218 (2015); <http://dx.doi.org/10.1116/1.4931035>

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**Growth and optimization of In<sub>x</sub>Ga<sub>y</sub>Al<sub>1-x-y</sub>Sb buffer layers for electronic and optoelectronic applications**

Richard Magno, Evan R. Glaser, Adrian Podpirka and James C. Culbertson

J. Vac. Sci. Technol. B **33**, 051219 (2015); <http://dx.doi.org/10.1116/1.4931029>

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## LITHOGRAPHY

**Formation of nanometer-thick delaminated amorphous carbon layer by two-step plasma processing of methacrylate-based polymer**

Dominik Metzler, Florian Weillboeck, Sandra C. Hernández, Scott G. Walton, Robert L. Bruce, Sebastian Engelmann, Lourdes Salamanca-Riba and Gottlieb S. Oehrlein

J. Vac. Sci. Technol. B **33**, 051601 (2015); <http://dx.doi.org/10.1116/1.4928493>

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**PMMA removal options by wet development in PS-b-PMMA block copolymer for nanolithographic mask fabrication**

Ahmed Gharbi, Raluca Tiron, Patricia Pimenta Barros, Maxime Argoud, Isabelle Servin, Xavier Chevalier, Celia Nicolet and Christophe Navarro

J. Vac. Sci. Technol. B **33**, 051602 (2015); <http://dx.doi.org/10.1116/1.4929548>

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**Optimal shift of pattern shifting for mitigation of mask defects in extreme ultraviolet lithography**

Xiaolei Liu, Sikun Li, Xiangzhao Wang and Heng Zhang

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## NANOMETER SCIENCE & TECHNOLOGY

**High-throughput nanogap formation by field-emission-induced electromigration**

Mitsuki Ito, Kohei Morihara, Takahiro Toyonaka, Kazuki Takikawa and Jun-ichi Shirakashi

J. Vac. Sci. Technol. B **33**, 051801 (2015); <http://dx.doi.org/10.1116/1.4927443>

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### **Facile technique for the removal of metal contamination from graphene**

George H. Wells, Michael R. C. Hunt, Toby Hopf, Konstantin V. Vassilevski, Enrique Escobedo-Cousin, Alton B. Horsfall, Jonathan P. Goss and Anthony O'Neill  
J. Vac. Sci. Technol. B **33**, 051802 (2015); <http://dx.doi.org/10.1116/1.4928422>

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### **Repairing nanoscale devices using electron-beam-induced deposition of platinum**

Lucas Peeters, Andrew J. Keller, Vladimir Umansky, Diana Mahalu and David Goldhaber-Gordon  
J. Vac. Sci. Technol. B **33**, 051803 (2015); <http://dx.doi.org/10.1116/1.4928718>

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### **Efficiency of pyramid textured silicon solar cell with aqueous solution deposited ZnO nanotip array**

Ming-Kwei Lee and Yu-Kai Chien  
J. Vac. Sci. Technol. B **33**, 051804 (2015); <http://dx.doi.org/10.1116/1.4929421>

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### **Three-dimensional modal analysis of carbon nanocones using molecular dynamics simulation**

Ali Narjabadifam, Farid Vakili-Tahami, Mohammad Zehsaz and Mir Masoud Seyyed Fakhrabadi  
J. Vac. Sci. Technol. B **33**, 051805 (2015); <http://dx.doi.org/10.1116/1.4929440>

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### **In situ atomic force microscopy imaging of structural changes in metal nanowires during feedback-controlled electromigration**

Mamiko Yagi, Takanari Saito and Jun-ichi Shirakashi  
J. Vac. Sci. Technol. B **33**, 051806 (2015); <http://dx.doi.org/10.1116/1.4929444>

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### **Ferromagnetic, spin glass, and antiferromagnetic behaviors in $Cd_{1-x}Mn_xTe$ nanowires**

Keshab R. Sapkota, Rajendra Dulal, Bishnu R. Dahal, Ian L. Pegg and John Philip  
J. Vac. Sci. Technol. B **33**, 051807 (2015); <http://dx.doi.org/10.1116/1.4929897>

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### **Three-dimensional particle tracking by pixel difference method of optical path length based on digital holographic microscopy**

Yanan Zeng, Xinyu Chang, Hai Lei, Xiaodong Hu and Xiaotang Hu  
J. Vac. Sci. Technol. B **33**, 051808 (2015); <http://dx.doi.org/10.1116/1.4929690>

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### **Nanoscale characterization of an electron emitting tip by field emission microscopy and scanning probe microscopy**

Norimichi Watanabe, Miyuki Tanaka and Tetsuo Shimizu

J. Vac. Sci. Technol. B **33**, 051809 (2015); <http://dx.doi.org/10.1116/1.4930308>

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**Correlation between dry etching resistance of Ta masks and the oxidation states of the surface oxide layers**

Makoto Satake, Masaki Yamada, Hu Li, Kazuhiro Karahashi and Satoshi Hamaguchi

J. Vac. Sci. Technol. B **33**, 051810 (2015); <http://dx.doi.org/10.1116/1.4930242>

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**Mechanisms of silicon damage during N<sub>2</sub>/H<sub>2</sub> organic etching for fin field-effect-transistor CMOS**

Tamotsu Morimoto, Hiroto Ohtake and Tomiko Wanifuchi

J. Vac. Sci. Technol. B **33**, 051811 (2015); <http://dx.doi.org/10.1116/1.4930244>

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**Energy band alignments of Al<sub>2</sub>O<sub>3</sub>-HfO<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub> nanolaminates-SiO<sub>2</sub>-p-type Si structures**

Abdulloh Rifai, Siddheswar Maikap and Yoshio Nakamura

J. Vac. Sci. Technol. B **33**, 051812 (2015); <http://dx.doi.org/10.1116/1.4931027>

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## **MEMS & NEMS**

**Removal of SU-8 by two types of hot-wire atomic hydrogen sources—Dissection of contributions by atomic hydrogen and substrate heating**

Koki Tanaka, Masafumi Kumano and Shuji Tanaka

J. Vac. Sci. Technol. B **33**, 052001 (2015); <http://dx.doi.org/10.1116/1.4927376>

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**Effect of oxygen ion beam bombardment on depth resolved hydrogen distribution in stoichiometric alumina thin films, deposited by e-beam evaporation**

Arijeet Das, Chandrachur Mukherjee, Rajiv Kamparath, Aniruddha Bose, Shreyashkar D. Singh, Deodatta M. Phase, Sanjay K. Rai, Satish C. Joshi and Tapas Ganguli

J. Vac. Sci. Technol. B **33**, 052002 (2015); <http://dx.doi.org/10.1116/1.4929418>

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## **MICROELECTRONIC & NANOELECTRONIC DEVICES**

**Improving the extraction of characteristic field enhancement factors from nonlinear Fowler–Nordheim plots: Call for experimental tests**

Thiago A. de Assis

J. Vac. Sci. Technol. B **33**, 052201 (2015); <http://dx.doi.org/10.1116/1.4927369>

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**Environmental, thermal, and electrical susceptibility of black phosphorus field effect transistors**

Zenghui Wang, Arnob Islam, Rui Yang, Xuqian Zheng and Philip X.-L. Feng  
J. Vac. Sci. Technol. B **33**, 052202 (2015); <http://dx.doi.org/10.1116/1.4927371>

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**Theoretical investigation of an in situ k-restore process for damaged ultra-low-k materials based on plasma enhanced fragmentation**

Anja Förster, Christian Wagner, Sibylle Gemming and Jörg Schuster  
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**Resistive switching characteristics of integrated polycrystalline hafnium oxide based one transistor and one resistor devices fabricated by atomic vapor deposition methods**

Hee-Dong Kim, Felice Crupi, Mindaugas Lukosius, Andreas Trusch, Christian Walczyk and Christian Wenger  
J. Vac. Sci. Technol. B **33**, 052204 (2015); <http://dx.doi.org/10.1116/1.4928412>

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**Optimization of annealing temperature for high-k-based gate oxides using differential scanning calorimetry**

Debaleen Biswas, Anil Kumar Sinha and Supratic Chakraborty  
J. Vac. Sci. Technol. B **33**, 052205 (2015); <http://dx.doi.org/10.1116/1.4929442>

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**Design of nonlinear metamorphic buffer layers for lattice-mismatched  $\text{In}_x\text{Ga}_{1-x}\text{As}/\text{GaAs}$  (001) semiconductor devices**

Tedi Kujofsa and John E. Ayers  
J. Vac. Sci. Technol. B **33**, 052206 (2015); <http://dx.doi.org/10.1116/1.4929411>

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**Diameter dependent thermal sensitivity variation trend in Ni/4H-SiC Schottky diode temperature sensors**

Vibhor Kumar, Shuvam Pawar, Anup S. Maan and Jamil Akhtar  
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**Amorphous In-Ga-Zn-O thin-film transistors fabricated by microcontact printing**

Xiaosong Du, Ryan T. Frederick, Yajuan Li, Zheng Zhou, William F. Stickle and Gregory S. Herman  
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**Crystal thickness and extinction distance measurements by convergent beam electron diffraction fitting and application in quantitative TEM holography analysis on p-**

### **n junctions**

Jie Zhu, Pik Kee Tan, Hao Tan, Dan Dan Wang, Ya Min Huang, Chang Qing Chen, Bing Hai Liu, Eddie Er, Si Ping Zhao, Jeffrey Lam and Zhi Hong Mai

J. Vac. Sci. Technol. B **33**, 052209 (2015); <http://dx.doi.org/10.1116/1.4929987>

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## **PLASMONICS**

### **Novel techniques and devices for in-situ film coatings of long, small diameter tubes or elliptical and other surface contours**

Ady Hershcovitch, Michael Blaskiewicz, Joesph Michael Brennan, Wolfram Fischer, Chong-Jer Liaw, Wuzhang Meng, Robert Todd, Art Custer, Aaron Dingus, Mark Erickson, Nader Jamshidi and Henry Joe Poole

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