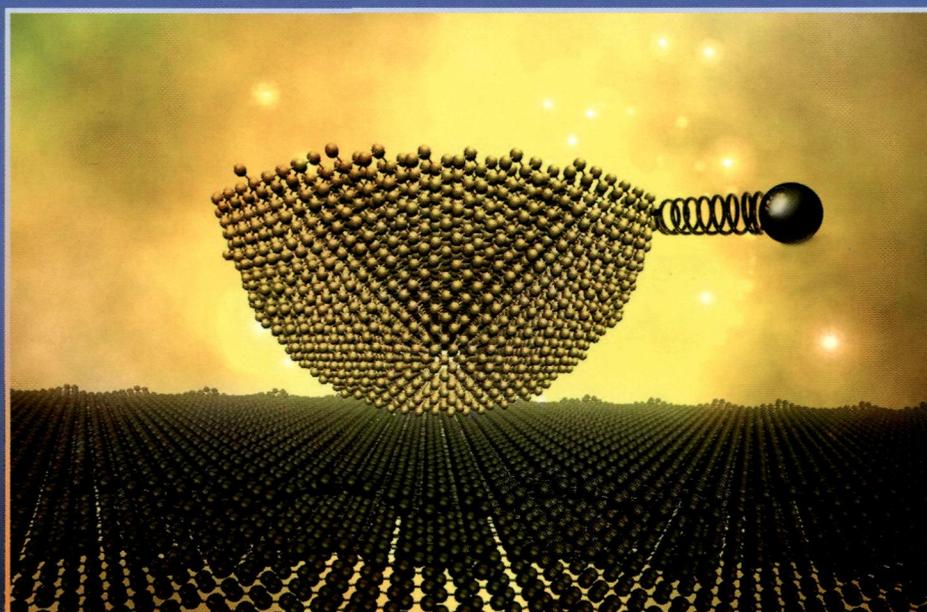


# JVSTA

Journal of Vacuum Science & Technology A | 2nd Series | Volume 31, Number 3 | May/June 2013

## Vacuum, Surfaces, and Films



*Image credit: Zhijiang Ye, Yalin Dong, Qunyang Li, and Ashlie Martini, JVST A, 31(3), p. 030801-1*

### **Review Article:**

## **Molecular Dynamics Simulation of Atomic Friction: A Review and Guide**

*-by Yalin Dong, Qunyang Li, and Ashlie Martini*



An AVS journal published by the Society  
through the American Institute of Physics

### Letters

- ToF-SIMS depth profiling of organic solar cell layers using an Ar cluster ion source**  
Vincent S. Smentkowski, Gilad Zorn, Amanda Misner, Gautam Parthasarathy, Aaron Couture, Elke Tallarek, and Birgit Hagenhoff ..... 030601
- Theoretical investigation of cubic B1-like and corundum (Cr<sub>1-x</sub>Al<sub>x</sub>)<sub>2</sub>O<sub>3</sub> solid solutions**  
Björn Alling, Ali Khatibi, Sergei I. Simak, Per Eklund, and Lars Hultman ..... 030602
- Enhancement of solution-processed zinc tin oxide thin film transistors by silicon incorporation**  
Sung Ryul Mang, Dae Ho Yoon, In Young Jeon, Ho Kyoon Chung, and Lyong Sun Pu ..... 030603
- Low-temperature CVD of η-Mn<sub>3</sub>N<sub>2-x</sub> from bis[di(tert-butyl)amido]manganese(II) and ammonia**  
Teresa S. Spicer, Charles W. Spicer, Andrew N. Cloud, Luke M. Davis, Gregory S. Girolami, and John R. Abelson ..... 030604

### Review Article

- Molecular dynamics simulation of atomic friction: A review and guide**  
Yalin Dong, Qunyang Li, and Ashlie Martini ..... 030801

### Interfaces

- Electron-injecting properties of Rb<sub>2</sub>CO<sub>3</sub>-doped Alq<sub>3</sub> thin films in organic light-emitting diodes**  
Jin Woo Park, Jong Tae Lim, Jong Sik Oh, Sung Hee Kim, Phuong Pham Viet, Myung S. Jhon, and Geun Young Yeom ..... 031101

(Continued)

*Journal of Vacuum Science & Technology A* (ISSN: 0734-2101) is published six times annually (Jan/Feb, Mar/Apr, May/Jun, Jul/Aug, Sep/Oct, Nov/Dec) by AVS through AIP Publishing LLC, Suite 1N01, 2 Huntington Quadrangle, Melville, NY 11747-4502. 2013 subscription rates are: US\$1720. POSTMASTER: Send address changes to *Journal of Vacuum Science & Technology A*, Membership Services, AVS, 125 Maiden Lane, 15th Floor, New York, NY 10038, membership@avs.org, www.avs.org. Periodicals postage paid at Huntington Station, NY 11746, and at additional mailing offices.

#### Subscription Prices (2013)

	U.S.A. and Poss.	Outside the U.S.A.*
JVST A <sup>†</sup>	\$1720	\$1830
JVST A <sup>‡</sup>	\$1950	\$2090
JVST A and B <sup>†</sup>	\$1950	\$2150
JVST A and B <sup>‡</sup>	\$1950	\$2160
JVST A and B <sup>‡</sup>	\$2250	\$2440

<sup>†</sup>Print and online.

<sup>‡</sup>Print, CD-ROM, and online.

<sup>‡</sup>CD-ROM and online only.

\*Nonmember subscriptions include air freight service.

**Back-Number Prices.** 2012 single copy: \$300; prior to 2012 single copy: \$186.

**Subscriptions, renewals, and address changes** should be addressed to: for members: *Membership Services, AVS, 125 Maiden Lane, 15th Floor, New York, NY 10038, membership@avs.org, www.avs.org*; Institutional Subscribers, please submit to *AIP Publishing Subscription Fulfillment Division, AIP Publishing LLC, Suite 1N01, 2 Huntington Quadrangle, Melville, NY 11747-4502*. Allow at least six weeks advance notice. For address changes please send both old and new addresses and, if possible, include a label from the plastic mailing wrapper of a recent issue. Missing issue requests will be honored only if received within six months of publication date (nine months for Australia and Asia).

**Single-copy orders (current and back issues)** should be addressed to AIP Publishing LLC, Circulation and Fulfillment Division, Suite 1N01, 2 Huntington Quadrangle, Melville, NY 11747-4502; Telephone: 800-344-6902 (or 516-576-2270 outside the U.S.A.), Fax at 516-349-9704, or E-mail at subs@aip.org.

**Reprints:** Reprints can be ordered with or without covers only in multiples of 50 from AIP Publishing, Circulation and Fulfillment/Reprints, Suite 1N01, 2 Huntington Quadrangle, Melville, NY 11747-4502; Fax: 516-349-9704; Telephone: 800-344-6909 (U.S. and Canada) or 516-576-2270.

**Document Delivery:** Copies of journal articles can be ordered for online delivery from DocumentStore, AIP Publishing's online document delivery service (<http://ojs.aip.org/documentstore/>).

**Online Access:** The *Journal of Vacuum Science and Technology A* is available online to AVS members at no additional charge; for details, please see <http://ojs.aip.org/jvsta/>. Abstracts of journal articles are available from AIP Publishing's SPIN Web Service (<http://ojs.aip.org/spinweb/>).

<b>Characterization of thin film adhesion by MEMS shaft-loading blister testing</b> Maria Berdova, Jussi Lyytinen, Kestutis Grigoras, Anu Baby, Lauri Kilpi, Helena Ronkainen, Sami Franssila, and Jari Koskinen .....	031102
--	--------

<b>Beyond hard x-ray photoelectron spectroscopy: Simultaneous combination with x-ray diffraction</b> Juan Rubio-Zuazo and German R. Castro .....	031103
---	--------

### Photovoltaics and Energy

<b>Investigation of shunt path evolution originated from transparent conductive oxides in Si-based thin film solar cells</b> Minho Joo, Jungmin Lee, Kyuho Park, Jin-Won Chung, Seh-Won Ahn, and Heon-Min Lee .....	031201
--	--------

### Plasma Science and Technology

<b>Characteristics of silicon etching by silicon chloride ions</b> Tomoko Ito, Kazuhiro Karahashi, Song-Yun Kang, and Satoshi Hamaguchi .....	031301
--	--------

<b>Real-time control of electron density in a capacitively coupled plasma</b> Bernard Keville, Yang Zhang, Cezar Gaman, Anthony M. Holohan, Stephen Daniels, and Miles M. Turner .....	031302
---	--------

<b>Nitrogen actinometry for measurement of nitrogen radical spatial distribution in large-area plasma-enhanced chemical vapor deposition</b> Changhoon Oh, Minwook Kang, Seungsuk Nam, and Jae W. Hahn .....	031303
---	--------

<b>Computational modeling study of the radial line slot antenna microwave plasma source with comparisons to experiments</b> Laxminarayan L. Raja, Shankar Mahadevan, Peter L. G. Ventzek, and Jun Yoshikawa .....	031304
--	--------

<b>Selective etching of TiN over TaN and vice versa in chlorine-containing plasmas</b> Hyungjoo Shin, Weiye Zhu, Lei Liu, Shyam Sridhar, Vincent M. Donnelly, Demetre J. Economou, Chet Lenox, and Tom Lii .....	031305
--	--------

<b>Impact of static magnetic fields on the radial line slot antenna plasma source</b> Jun Yoshikawa and Peter L. G. Ventzek .....	031306
--	--------

### Surfaces

<b>Measurement of the Auger parameter and Wagner plot for uranium compounds</b> Kiel S. Holliday, Wigbert Siekhaus, and Art J. Nelson .....	031401
--	--------

<b><i>In situ</i> formation and electron-spectroscopic study of bis(arene) V and Cr compounds on a graphite surface</b> Victor M. Bermudez .....	031402
---	--------

<b>Subnanometer-resolution depth profiling of boron atoms and lattice defects in silicon ultrashallow junctions by ion beam techniques</b> Lakshmanan H. Vanamurthy, Mengbing Huang, Hassaram Bakhru, Toshiharu Furukawa, Nathaniel Berliner, Joshua Herman, Zhengmao Zhu, Paul Ronsheim, and Bruce Doris .....	031403
---	--------

<b>Improvement of the surface quality of semi-insulating InP substrates through a novel etching and cleaning method</b> Jingming Liu, Youwen Zhao, Zhiyuan Dong, Fengyun Yang, Fenghua Wang, Kewei Cao, Tong Liu, Hui Xie, and Teng Chen .....	031404
--	--------

<b>Vibronic fine structure in high-resolution x-ray absorption spectra from ion-bombarded boron nitride nanotubes</b> Mladen Petracic, Robert Peter, Marijana Varasanec, Lu Hua Li, Ying Chen, and Bruce C. C. Cowie .....	031405
---	--------

<b>Low temperature oxidation of plutonium</b> Art J. Nelson and Paul Roussel .....	031406
---	--------

(Continued)

## Thin Films

<b>Effect of quantum dot length on the degree of electron localization in polymer wires grown by molecular layer deposition</b> Tetsuzo Yoshimura and Sho Ishii .....	031501
<b>Axial resistivity measurement of a nanopillar ensemble using a cross-bridge Kelvin architecture</b> Abeed Lalany, Ryan Thomas Tucker, Michael Thomas Taschuk, Michael David Fleischauer, and Michael Julian Brett .....	031502
<b>Validity of automated x-ray photoelectron spectroscopy algorithm to determine the amount of substance and the depth distribution of atoms</b> Sven Tougaard .....	031503
<b>Polarity control and transport properties of Mg-doped (0001) InN by plasma-assisted molecular beam epitaxy</b> Soojeong Choi, Feng Wu, Oliver Bierwagen, and James S. Speck .....	031504
<b>Influence of plasma treatment on optical and electrical properties of a-InGaZnO films</b> Li Xifeng, Xin Enlong, Shi Jifeng, Li Chunya, and Zhang Jianhua .....	031505
<b>Effects of preparation conditions on the magnetocaloric properties of Gd thin films</b> Hillary F. Kirby, Dustin D. Belyea, Jonathon T. Willman, and Casey W. Miller .....	031506
<b>Glancing angle deposition on a roll: Towards high-throughput nanostructured thin films</b> Kathleen M. Krause, Michael T. Taschuk, and Michael J. Brett .....	031507
<b>Effects of gas environment on electronic and optical properties of amorphous indium zinc tin oxide thin films</b> Yus Rama Denny, Sunyoung Lee, Kangil Lee, Soonjoo Seo, Suhk Kun Oh, Hee Jae Kang, Sung Heo, Jae Gwan Chung, Jae Cheol Lee, and Sven Tougaard .....	031508
<b>Atomic layer deposition of titanium dioxide using titanium tetrachloride and titanium tetraisopropoxide as precursors</b> Rohan P. Chaukulkar and Sumit Agarwal .....	031509

## Vacuum Science and Technology

<b>Electron stimulated desorption from the 316 L stainless steel as a function of impact electron energy</b> Oleg B. Malyshev, Rebecca M. A. Jones, Benjamin T. Hogan, and Adrian Hannah .....	031601
<b>Investigation of the time evolution of STM-tip temperature during electron bombardment</b> David Hellmann, Ludwig Worbes, Konstantin Kloppstech, Nils Köhne, and Achim Kittel .....	031602

## Brief Reports and Comments

<b>Versatile Rb vapor cells with long lifetimes</b> John F. Hulbert, Matthieu Giraud-Carrier, Tom Wall, Aaron R. Hawkins, Scott Bergeson, Jennifer Black, and Holger Schmidt .....	033001
<b>CUMULATIVE AUTHOR INDEX</b> .....	A13

---

**On The Cover:** Zhijiang Ye, Yalin Dong, Qunyang Li, and Ashlie Martini, *JVST A*, **31**(3), p. 030801-1 (2013). Cover shows an atomistic model of an atomic force microscope's nanoscale tip sliding across a graphite substrate.