

# The 4th Vacuum and Surface Sciences Conference of Asia and Australia

## VASSCAA-4 (October 28-31, 2008, Kunibiki Messe, Matsue, Japan)

### Final Report

#### 1. Introduction

The VASSCAA series is organized to create a new forum in Asia and Australia to discuss vacuum, surface and related sciences, techniques and applications. The conference is officially endorsed by the International Union for Vacuum Science, Technique and Applications (IUVSTA). The International Steering Committee (ISC) of VASSCAA is comprised of Vacuum Science Societies in six countries: [Australia](#), [China](#), [India](#), [Japan](#), [Korea](#) and Pakistan. The conference is organized once every three years. The conference location rotates among cities in Asia and Australia. The first VASSCAA was organized by the Vacuum Society of Japan and was held in 1999 in Tokyo. VASSCAA-2 was held in 2002 in Hong Kong (26-30 August, 2002), and VASSCAA-3 in Singapore (3-8 July, 2005) in conjunction with Symposium of ICMAT 2005.

This time, the 4th Vacuum and Surface Sciences Conference of Asia and Australia (VASSCAA-4, October 28-31 2008 at Kunibiki Messe in Matsue City, Japan) was held in conjunction with 49th Annual Symposium of the Vacuum Society of Japan (ASVSJ-49), for celebration of 50th anniversary of the Vacuum Society of Japan.

Proceedings of VASSCAA-1 was published in *Applied Surface Science*, and VASSCAA-2 and VASSCAA-3 were published in *Surface Review and Letters*. The proceedings of VASSCAA-4 will be published as special issues in *Applied Surface Science* and *VACUUM*.

#### 2. Organization and Sponsors

##### *Organized by*

[Vacuum Society of Japan \(VSJ\)](#)

##### *Endorsed by*

[International Union for Vacuum Science, Technique and Application \(IUVSTA\)](#)

##### *In cooperated with*

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**4. Scientific Program**

The final scientific program of VASSCAA-4 covered the following areas accordingly classified by IUUSTA;

Applied Surface Science [AS]

Electronic Materials & Processing [EM]

Nanometer Structure [NS]

Plasma Science & Technique [PS]

Surface Engineering [SE]

Surface Science [SS]

Thin Films [TF]

Vacuum Science & Technology [VS]

The program included two *Plenary talks*, one *Tutorial*, 27 of *Invited talks* and a *VS Special Session*, as described below. The number of contributed papers was 470; 93 (oral) and 385 (poster).

The *tutorial lecture* was newly planned in VASSCAA-4, so that young researcher, participating in VASSCAA-4, can study not only an advanced but also a basic theory concerning surface science. In this tutorial talk, an introduction of the first-principles density functional approaches, in particular, those applied to the fields of surfaces, interfaces and nano-materials was given.

The *VS Special Session*, also being a new program in VASSCAA, was aimed to give the *Exhibitors* an opportunity to present their own technical R&D ever experienced, concerning their products, apparatus, materials, processing techniques and know-how. The Manufacturers' presentation was each 10 min including

discussion.

### **Plenary Talk**

Ugo Valbusa (Genova, Italy): Oct. 28 (Tue)

*"Ions as tool for nano-fabrication"*

Tsuneya Ando (Tokyo, Japan): Oct. 31 (Fri)

*"Electron transport in graphene mono and multi-layers"*

### **Tutorial**

M. Tsukada (Tokyo, Japan): SS/NS/AS/Oct. 29 (Wed)

*"Role of theoretical approaches for surfaces interfaces, and nano-structures"*

### **Invited Talk**

Q. Xue (Beijing, China): NS/SS/28A I 01

*"Manipulating molecular spins coupling with a low temperature scanning tunneling microscope"*

C. Hirjibehedin (London, UK): NS/SS/28A I 06

*"Spin-Excitation Spectroscopy: Probing individual magnetic nanostructures on the atomic scale"*

A. Winkler (Graz, Austria): SS/28A I 11

*"Adsorption, reaction and desorption of hydrogen on modified Pd(111) surfaces"*

L. Dolcino (Torino, Italy): VS/28B I 01

*"50 years of Varian sputter ion pumps and new technologies"*

W. B. Thompson (Peabody, USA): AS/28B I 06

*"The Helium Ion Microscope - Operation, imaging and materials analysis fundamentals"*

C.-S. Chang (Taipei, Taiwan): SS/AS/28B I 11

*"In-situ growth, manipulation and measurements on multiwalled carbon nanotubes"*

C. Adachi (Kyushu, Japan): TF/28C I 06

*"Challenges of organic thin films for optoelectronic devices-OLED, OFET and Organic Laser Diodes"*

C.-C. Lee (Taipei, Taiwan): TF/28C I 11

*"Stress Analysis of Thin Film"*

H.W. Yeom (Seoul, Korea): SS/29A I 01

*"Tuning electronic structures of surface atomic wires"*

M. Dürr (Esslingen, Germany): SS/29A I 06

*"Elementary processes of hydrogen on silicon surfaces: adsorption, diffusion, desorption"*

M. Kawai (Kashiwa, Japan): SS/29A I 10

*"Configuration of water dimer on Pt(111) determined by an action spectrum utilizing inelastic electron processes using STM"*

M. Altman (Hong Kong, China): SS/AS/29B I 06

*"Anomalous diffusion in Pb/Si(111): kinetic pathway to self-organized quantum island growth"*

H. Petek (Pittsburgh, USA): SS/29B I 10

*"The electronic structure of alkali atoms and atomlike molecules on metal surfaces"*

O. Takai (Nagoya, Japan): TF/29C I 01

*"Novel biological surface mimicking structure of lotus leaf"*

G.-Y. Yeom (Suwon, Korea): TF/29C I 06

*"Nano-crystalline Si deposition using large-area internal-type ICP at room temperature"*

K. Tachibana (Kyoto, Japan): PS/29C I 10

*"Microplasmas: their characteristics and new applications"*

T. Komaki (Osaka, Japan): PS/29C I 14

*"Latest topics and technologies in plasma display panel"*

A. Wee (Singapore, Singapore): SS/NS/30A I 01

*"Growth, structure, and molecular interactions on epitaxial graphene"*

C. Oshima (Tokyo, Japan): NS/AS/30A I 06

*"Thermodynamically stable single-atom electron sources"*

P. Chiggiato (Geneva, Switzerland): VS/AS/30B I 01

*"NEG thin films: from development to application in the Large Hadron Collider"*

C. Fadley (Davis, USA): SS/AS/30B I 06

*"Novel detection and measurement methods in photoelectron spectroscopy: standing waves, hard x-rays, and time resolution"*

S. Choopun (Chiang Mai, Thailand): EM/30C I 01

*"Zinc oxide nanostructures for applications as ethanol sensors and dye-sensitized solar cells"*

T. Kawarada (Tokyo, Japan): EM/30C I 06

*"Controlled growth of single and double walled carbon nanotubes for densely packed electrodes and super capacitors"*

Y. Saito (Tsukuba, Japan): VS/31A I 00

*"Materials and processing of vacuum components for J-PARC"*

E. Rotenberg (Berkeley, USA): SS/31A I 01

*"Electronic structure of epitaxial graphene by angle-resolved photoemission"*

T. Ando (Kanazawa, Japan): AS/NS/31B I 01

*"High-speed AFM and visualization of dynamic biomolecular processes"*

S. Takata (Kyoto, Japan): VS/31C I 01

*"Fluid modeling for the Knudsen compressor on the basis of the kinetic theory of gases"*

**VS Special Session** (08:30-10:10 Wed. Oct. 29)

Hitachi Cable, Ltd.

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Mitsui Mining Materials Co., Ltd.

Omicron NanoTechnology Japan, Inc.

Osaka Rasenkan Kogyo Co., Ltd.

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Varian Vacuum Technologies

NATIONAL INSTITUTE OF VACUUM SCIENCE & TECHNOLOGY (Pakistan)

## **5. IUVSTA-Elsevier Student Awards**

The Awards were given to the following two students selected by VASSCAA-4 Program Committee.

*Mr. Kosuke Monna* (date of birth; 1984.10.23, Nationality; Japan)

University of Tsukuba (staff member; Prof. Tokushi Kizuka)

Presented papers:

"Current-Voltage Characteristics of Nanometer-Sized Platinum Contacts" (28P007)

"Structure and Conductance of Single-Atom-Width Platinum Wires" (28P127)

*Mr. Takeshi Aoki* (date of birth; 1984.5.4, Nationality; Japan)

Yokohama National University (staff member; Prof. Ken-ichi Shudo)

Presented Paper:

"Modification of Titanium Silicide Growth by H-termination on Si(001)-2x1 Observed with Scanning Tunneling Microscopy" (29P170)

## **6. Financial Support**

The VASSCAA-4 organizing committee gave financial support to 22 of participants as a part of travel/accommodation expense. The registration fees of the plenary and invited speakers were waived.

**7. Exhibition** (13:00-17:00 Tue. Oct. 28, 10:00-15:00 Wed. Oct. 29)

**Exhibitors**

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Varian Vacuum Technologies



Shimane University

Shimane Institute of Industrial Technology

### ***Catalogue Showing***

Hitachi Haramachi Electronics Co., Ltd.

IRIE KOKEN CO., LTD

SHIMADZU EMIT CO., LTD

SurFtech Transnational Co., Ltd.

### **8. Day Nursery** (during conference)

The Nursery Room with two nursery assistants was open during the conference. The participants could leave their accompanying children of less than 6 years old in the room (free of charge).

### **9. Conference Excursion** (12:00-17:00 Thu. Oct. 30)

*Course 1.* (133 of participants)

Museum on the history of Tataru and Sugaya Tataru in Unnan City, and Izumo Taisha Grand Shrine

*Course 2.* (197 of participants)

Adachi Museum of Art, and Izumo Taisha Grand Shrine

“Tataru” itself is a clay furnace where iron is made. Tataru process has a history stretching back more than one thousand years, being a method for fabricating iron unique to Japan.

“Adachi Museum of Art” is well known for both its superb Japanese gardens and its collection of contemporary Japanese paintings, comprising approximately 1,300 of paintings produced after the Meiji period and centering on the works of Yokoyama Taikan.

“Izumo Taisha” is dedicated to one of the most famous Japanese-mythical god, Okuninushi. Every year, 72 rituals are held, including the Kamimukae Festival when gods throughout Japan are welcomed to the shrine.

### **10. Conference Banquet** (18:00-20:00 Thu. Oct. 30)

The conference banquet was held at the “[\*Vogel Park\*](#)” together with 49th Annual Symposium of the Vacuum Society of Japan. More than 320 of participants enjoyed the Japanese traditional dance “*Iwami Kagura*” and drumming “*Kakeya Taiko*”. During the banquet, “*IUVSTA-Elsevier Student Awards*” ceremony was performed.

## 11. Summary Statistics

Program statistics (details; see Tables 1 and 2)

|                     | VASSCAA-4 | 49-ASVSJ | Total |
|---------------------|-----------|----------|-------|
| Plenary             | 2         |          | 2     |
| Tutorial            | 1         |          | 1     |
| Invited talk        | 27        | 16       | 43    |
| Oral presentation   | 93        | 20       | 113   |
| Poster presentation | 385       | 62       | 447   |
| Total               | 508       | 98       | 606   |

Participant statistics (details; see Table 3)

|                     | VASSCAA-4 | 49-ASVSJ | Total |     |
|---------------------|-----------|----------|-------|-----|
| Regular             | 345       | 69       |       | 414 |
| Student             | 189       | 47       |       | 236 |
| Accompanying person |           |          | 11    | 11  |
| Exhibitors          |           |          | 77    | 77  |
| Total               | 534       | 116      | 88    | 738 |

Reported by



Tatsuo Okano

Chair, VASSCAA-4

November 7, 2008