

4th International Workshop on Plasma Sciencetech for All Something(Plasas-4)

October 8-10, 2011, Beijing, China



Summer Palace



The Forbidden City

Invitation to the workshop

We organize a research workshop with a purpose to well bridge internationally-acting scientists and engineers. The workshop consists of a limited number of selected people in China and Japan. The workshop will be carried out through

- exchanging academic information on plasma science and technology and their applications,
- promoting plasma science and technology,
- collaborating in research projects.

The workshop will provide the scientific and technological fruit obtained by attendees so far. By discussing their scientific and technological viewpoints, the attendees will possess the information as common property. The presentation will be done for 20 min-oral presentation and 10 min discussion.

• Organizing Committees

Yuan Fangli (Chair) (Institute of Process Engineering, Chinese Academy of Sciences)

Akatsuka Hiroshi (Co-Chair) Tokyo Institute of Technology, Japan

• Advisory Committees

Yukimura Ken National Institute of Advanced Industrial Sciences and Technology, Japan

Chen Qiang Beijing Institute of Graphic Communication, China

• Workshop venue:

Institute of Process Engineering, Zhongguancun, Haidian, Beijing, China



The workshop venue is located Zhongguancun of Beijing, China

Invited Speakers

Wang Haixing	Beihang University
Yukimura Ken	National Institute of Advanced Industrial Science and Technology, Japan
Hu Peng	Institute of Process Engineering of Chinese Academy of Sciences
Takaki Koichi	Iwate University
Liu Dawei	Huazhong University of Science and Technology
Yamada Hideaki	National Institute of Industrial Science and Technology, Japan
Feng Wenran	Beijing Institute of Petrochemical Technology, China
Ohtsu Yasunori	Saga University, Japan
Zhang Yuefei	Beijing University of Technology, Beijing, P. R. China
Liu Zhongwei	Beijing Institute of Graphic Communication, China
Akatsuka Hiroshi	Tokyo Institute of Technology, Japan
He Feng	Beijing Institute of Technology
Shinohara Masanori	Nagasaki University, Japan
Ge Nan	Tsinghua University, China.
Ohta Takayuki	Meijo University, Japan
Zheng Jie	Peking University

Program

Oct 8 (Saturday)

15:00-21:00 Excursion

(1) Summer Palace (2) Dinner in city and go back to hotel

Oct 9 (Sunday)

9:00-9:10 General Assembly; Opening ceremony

9:10-9:40 Wang Haixing

“Recent progress in the modeling studies of flow and heat transfer characteristics of thermal plasma jets ”

9:40-10:10 Yukimura Ken

“High-Power Pulsed Plasma Production and Film Preparation”

10:10-10:40 Hu Peng

“Thermal plasma synthesis of highly efficient phosphors and their photoluminescence investigation”

10:40-11:00 Coffee break

11:00-11:30 Takaki Koichi

“Generation of Nonthermal Plasmas in Atmospheric Pressure
by Nanoseconds Pulsed Voltage”

11:30-12:00 Liu Dawei

“Plasma plume propagation characteristics of pulsed radio frequency plasma jet”

12:00-13:00 Lunch

13:00-13:30 Yamada Hideaki

“Activities of Numerical simulations to study mechanism of microwave plasma CVD of Diamond”

13:30-14:00 Feng Wenran

“ Several new-type ternary compound films prepared by pulsed high energy density plasma ”

14:00-14:30 Ohtsu Yasunori

“High-density RF plasma by hollow cathode for plasma processing”

14:30-15:00 Zhang Yuefei

“Nanoporous and hollow Ag nanotube fabricated by plasma method”

15:00-15:20 Coffee break

15:20-15:50 Liu Zhongwei

“Plasma-Enhanced Atomic Layer Deposition of Al and AlN Films”

15:50-16:20 Akatsuka Hiroshi

“Spectroscopic diagnostics of dissociation degree of nitrogen
in low-pressure discharge N₂ plasmas and molecular processes”

16:30-17:00 He Feng

“Study of the discharge modes in micro-hollow cathode”

17:00-18:00 Laboratory tour

18:00-21:00 Dinner and drinks

Oct 10 (Monday)

9:00-9:30 Shinohara Masanori

“Plasma Process Monitoring due to Infrared Spectroscopy”

9:30-10:00 Ge Nan

“A Visible Image Processing based Quantitative Evaluation Method of Plasma Stability”

10:00-10:30 Ohta Takayuki

“Disinfection of fungal spores by atmospheric pressure plasma”

10:30-11:00 Zheng Jie

“Plasma processed inorganic nanostructures for energy storage applications ”

Profiles of Participants(Japan)



Hiroshi Akatsuka was born in Kyoto, Japan in 1962. He received the B. Eng. and M. Eng. degrees from Kyoto University in 1985 and in 1987, respectively. He joined NEC Corporation during 1987-1991, specialized in digital communications equipment for space applications and in laser interferometer

equipment for fundamental researches like thermonuclear fusion plasmas diagnostics and gravitational wave detector for space sciences. He moved to Research Laboratory for Nuclear Reactors, Tokyo Institute of Technology as a research associate in 1991. Then he started researches of plasma diagnostics by spectroscopic observation. He received the Ph.D. degree from Tokyo Institute of Technology in 1995. He has been an associate professor of Research Laboratory for Nuclear Reactors and Department of Energy Sciences, Tokyo Institute of Technology, Japan, since 1995. He is a member of the institute of Electrical Engineers of Japan, IEEE, the Japan Society of Applied Physics, the Physical Society of Japan, the Japan Society of Plasma Science and Nuclear Fusion Research, the Spectroscopical Society of Japan, the Laser Society of Japan, Atomic Energy Society of Japan, Combustion Society of Japan, and the Visualization Society of Japan. His research interests include atomic and molecular processes in plasmas, plasma diagnostics by passive spectroscopic measurement, and behavior of arc-jet plasmas along various magnetic field, particularly fundamentals for space-propulsion applications

Academic records:

- 1 Y. Ichikawa, T. Sakamoto, A. Nezu, H. Matsuura and H. Akatsuka; Actinometry Measurement of Dissociation Degrees of Nitrogen and Oxygen in N_2-O_2 Microwave Discharge Plasma, *Jpn. J. Appl. Phys.*, **49**, [10] pp. 106101 (16 pages) (2010).
- 2 J. Mizuochi, T. Sakamoto, H. Matsuura and H. Akatsuka; Evaluation of Electron Energy Distribution Function in Microwave Discharge Plasmas by Spectroscopic Diagnostics with Collisional Radiative Model, *Jpn. J. Appl. Phys.*, **49**, [3] 036001 (14 pages) (2010).
- 3 K. Yoshida, T. Shibata, A. Nezu, H. Matsuura and H. Akatsuka; Flowing Characteristics of Cold Arc Jet Plasma along Open Field Lines, *J. Plasma Fusion Res. Series*, **8**, pp. 923-927 (2009).
- 4 T. Ichiki, T. Sakamoto, H. Matsuura and H. Akatsuka; Numerical

Study on the Gas Temperature of Microwave Discharge Rare Gas Plasmas as a Rarified Gas Dynamic System, *J. Plasma Fusion Res. Series*, **8**, pp. 768-772 (2009).

5 K. Yoshida, T. Shibata, A. Nezu, H. Matsuura and H. Akatsuka; Ion Acceleration in Arc Jet Plasma along Open Field Lines, *IEEE Trans. Plasma Sci*, **37**, [8], pp. 1414-1418 (2009).

6 T. Yuji, S. Fujii, N. Mungkung, and H. Akatsuka; Optical Emission Characteristics of Atmospheric-Pressure Nonequilibrium Microwave Discharge and High-Frequency DC Pulse Discharge Plasma Jets, *IEEE Trans. Plasma Sci*, **37**, [6], pp. 839-845 (2009).

7 K. Yoshida, T. Kanuma, H. Ichii, A. Nezu, H. Matsuura and H. Akatsuka; Flow Characteristics of a Cold Helium Arc-Jet Plasma along Open Field Lines, *IEEE Trans. Elec. and Electron. Eng.*, **4**, [3], pp. 416-421 (2009).

8 H. Akatsuka; Excited Level Populations and Excitation Kinetics of Nonequilibrium Ionizing Argon Discharge Plasma of Atmospheric Pressure, *Phys. Plasmas*, **16**, [4], pp. 043502 (16 pages) (2009).

9 T. Yuji, H. Akatsuka, N. Mungkung, B. W. Park and Y. M. Sung; Surface Treatment of TiO_2 Films for Dye-Sensitized Solar Cells Using Atmospheric-Pressure Non-Equilibrium DC Pulse Discharge Plasma Jet, *Vacuum*, **83**, pp. 124-127 (2009).

10 T. Sakamoto, H. Matsuura and H. Akatsuka. Spectroscopic Study on the Vibrational Population of $N_2 C^3\Pi$ and $B^3\Pi$ States in a Microwave Nitrogen Discharge, *J. Appl. Phys.*, **101**, pp. 023307 (7 pages) (2007).

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Takayuki Ohta was born in Mie, Japan in 1976. He received the B.Eng. and M.Eng. degrees in Electrical and Electronic Engineering from Shizuoka University, Shizuoka, Japan in 1998 and 2000, respectively. He received also Ph. D (Eng.) degree in Quantum Engineering from Nagoya University, Nagoya, Japan

in 2003.

From 2003 to 2011, he worked for the faculty of systems engineering, Wakayama University. He is currently an Associate Professor in the faculty of science and technology, Meijo University, Aichi, Japan.

His researches are plasma processing such as sputtering and bio application and its diagnostics using optical techniques. The details are as follows;

- Development of novel non-contact temperature measurement for semiconductor substrate using optical interferometer.(ref.1,2)
- Disinfection of fungi for agricultural field using atmospheric pressure plasma, and investigation of the disinfection mechanism such as UV, ozone, and the other radicals. (ref.3,4)
- Deposition of the transparent conducting film such as IZO and GZO using magnetron sputtering and the diagnostics of plasma using absorption spectroscopy. (refs.5,6)
- Diagnostics of plasma using spectroscopy such as UV and IR absorption spectroscopy, laser induced fluorescence, and also optical emission spectroscopy. (ref.7)

He is a member of the Japan society of Applied Physics (Plasma Electronics division), The Spectroscopical Society of Japan, The Optical Society of Japan and The Society for Antibacterial and Antifungal Agents, Japan.

Academic records:

1. C. Koshimizu, T. Ohta, T. Matsudo, S. Tuchitani, M. Ito, Low-coherence interferometry - based non-contact temperature monitoring of a silicon wafer and chamber parts during plasma etching, *Applied Physics Express*, vol.3, 056201-1 - 056201-3 (2010).
2. T. Ohta, C. Koshimizu, K. Kawasaki, K. Takeda, M. Ito, Simultaneous measurement of substrate temperature and thin film-thickness on SiO₂/Si wafer using optical fiber-type low-coherence interferometry, *Journal of Applied Physics*, vol.105, 013110 (2009)
3. S. Iseki, T. Ohta, A. Aomatsu, M. Ito, H. Kano, Y. Higashijima, M. Hori, Rapid inactivation of *Penicillium digitatum* spores using high-density non-equilibrium atmospheric pressure plasma, *Applied Physics Letters* (accept for publication) (2010).
4. T. Ohta, M. Ito, and M. Hori, Disinfection of Fungi by Non-Equilibrium Atmospheric Pressure Plasma, *Sterilization and Disinfection by Plasma: Sterilization Mechanisms, Biological and Medical Applications* (Editors: Akikazu Sakudo, Hideharu Shintani), Nova Science Publishers, Inc., NY, USA, ISBN: 978-1-61668-782-3
5. T. Ohta, M. Ito, Y. Tachibana, S. Taneda, S. Takashima, M. Hori, H. Kano, and S. Den, Simultaneous monitoring of multi-metallic atom densities in plasma processes employing a multi-micro hollow cathode lamp, *Applied Physics Letters*, vol.90, 251502 (2007).
6. T. Ohta, M. Inoue, N. Takota, M. Ito, Y. Higashijima, H. Kano, S. Den, M. Hori, Simultaneous monitoring of atomic density using

multi-micro hollow cathode lamp in a sputtering process for a transparent conductive film, The 10th international symposium on sputtering & plasma processes -ISSP 2009- , FS 1-3, Kanazawa, Japan, 8-10, July, (2009).

7. T.Ohta, K.Hara, T.Ishida, M.Hori, T.Goto, M.Ito, S.Kawakami, N.Ishii Measurement of Si, SiF, SiF₂, radicals and SiF₄ molecule using very high frequency capacitively coupled plasma employing SiF₄, *Journal of Applied Physics*, vol.94, No.3, pp.1428-1435 (2003).

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Yasunori Ohtsu received the B.E. and M.E. degrees in Electrical Engineering and the Dr.Eng. degree in Energy and Material Science from Saga University, Saga, Japan, in 1989, 1991, and 1997, respectively. He is currently an Associate Professor with the Department of Electrical and Electronic Engineering, Graduate School of Science and Engineering, Saga University.

His current research interests are in high-density radio-frequency(RF) plasma and its material processing. Typically, he has studied the production of high-density RF hollow cathode plasma and the deposition of functional thin films such as water repellency or protective layer of china. He is also interested in the study on the reduction of energy consumed by plasma production.

Academic records:

- 1 Y.Ohtsu, N.Wada, T.Misawa and H.Fujita, "Preparation of Water-Repellent Thin Film with Inductive Plasma using C₂H₂F₂/Ar gases and Investigation of Its Adhesion by Positively Pulse-Biasing", *Trans. Mater. Res. Soc. Jpn*, 36, (2011)pp.95-98.
- 2 Y.Ohtsu and H.Urasaki, "Development of high-density radio frequency plasma source with a ring-shaped trench hollow electrode for dry processing", *Plasma Sources Sci. Tech.*, 19,(2010)045012(6pp).
- 3 Y.Ohtsu, C.Nakamura, T.Misawa, H.Fujita, M.Akiyama and K.Yukimura, "Production of high-density capacitively coupled plasma with RF multi-hollow cathode and/or high secondary electron emission for DLC film preparation", *Plasma Proc. Polym.* 6,(2009)pp. S458-S461.

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Masanori Shinohara was born in Shiga, Japan in 1971. He received B.E. in Electrical Engineering from Tokyo University of Science, Japan in 1996. He received M.E. of Electronics from Tohoku University in 1998. Finally, he received Ph.D in Electronics from Tohoku University in 2001. Doctoral thesis was

“Investigation on growth process of Si and SiC crystal”. He developed “in-situ” infrared spectroscopic technique with Prof. M. Niwano in the doctoral course. He also worked with Prof. M. Niwano at Research Institute of Electrical Communications, Tohoku University, as a Post-doctoral fellow from April 2001 to March 2002.

He joined Prof. H. Fujiyama’s group at Nagasaki University as a research associate in April, 2002. He also joined Prof. R.J. Hamers’ group, Dep. of chemistry, UW-Madison in USA, as a visiting scientist between Dec. 2004 and Sep. 2005. He returned to Fujiyama’s group, Nagasaki University in Oct. 2005. He has been an assistant professor since April 2007. He also joined Prof. R. d’Agostino’s group, Dep. Chemistry, University of Bari, Italy. He learned the application of amorphous carbon films for fuel cells.

He is a member of Applied Physics Society of Japan, Surface Science Society of Japan, Material Research Society of Japan, Surface Finishing Society of Japan, Institute of Electronics, Information and Communication Engineers, and American Vacuum Society. He is now an editorial member of Surface Science Society of Japan.

His current major is the monitoring of surface reactions during plasma process, including plasma enhanced chemical vapor deposition (PECVD) process, and plasma treatment process, with “in-situ” and “real-time” infrared spectroscopy in multiple internal reflection geometry (MIR-IRAS). Especially, His research interests are concentrated on surface reactions during amorphous carbon film deposition and on Si surface modification process during hydrogen plasma. He also now tries to monitor the film deposition process during solution plasma.

Academic records:

- 1 M. Shinohara, K. Hara, Y. Takami, Y. Takaki, Y. Matsuda, and H. Fujiyama, Transactions of MRS-Japan, in press.
- 2 M. Shinohara, S. Zhang, K. Kotani, K. Akaki, Y. Matsuda, H. Fujiyama, Transactions of MRS-Japan, 35 (2010) 567.
- 3 M. Shinohara, H. Kawazoe, T. Inayoshi, T. Kawakami, Y. Matsuda, H. Fujiyama, Y. Nitta, and T. Nakatani: Thin Solid Films, 518 (2010) 3497.

4 M. Shinohara, K. Cho, Y. Matsuda, T. Inayoshi, H. Kawazoe, H. Fujiyama, Y. Nitta, and T. Nakatani: Journal of Vacuum Science and Technologies A, 27(2009) 813.

5 M. Shinohara, H. Shibata, K. Cho, K. Okamoto, T. Nakatani, Y. Matsuda, and H. Fujiyama: Thin Solid Films, 516 (2008) 4379.

6 M. Shinohara, H. Shibata, K. Cho, T. Nakatani, K. Okamoto, Y. Matsuda, and H. Fujiyama: Appl. Sur. Sci., 253 (2007) 6242.

7 M. Shinohara, K. Iwatsuji, T. Katagiri, H. Shibata, Y. Matsuda, and H. Fujiyama: Appl. Sur. Sci., 252 (2006) 8589.

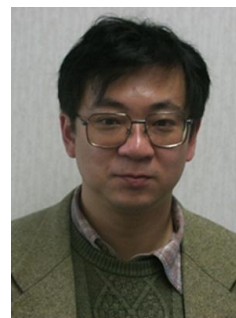
8 M. Shinohara, T. Katagiri, K. Iwatsuji, H. Shibata, Y. Matsuda, and H. Fujiyama: Thin Solid Films, 506-507 (2006) 710.

9 M. Shinohara, T. Katagiri, K. Iwatsuji, Y. Matsuda, H. Fujiyama, Y. Kimura and M. Niwano: Thin Solid Films, 475 (2005) 128.

10 M. Shinohara, T. Katagiri, K. Iwatsuji, Y. Matsuda, H. Fujiyama, Y. Kimura and M. Niwano: Thin Solid Films, 464-465 (2004) 14.

11 M. Shinohara, T. Kuwano, Y. Akama, Y. Kimura, M. Niwano, H. Ishida, and R. Hatakeyama: Journal of Vacuum Science and Technology A, 21 (2003) 25.

Contact: sinohara@nagasaki-u.ac.jp



Koichi Takaki received the B.Eng., M.Eng, and Dr.Eng. degrees in Electrical Engineering from Kumamoto University, Kumamoto, Japan in 1986, 1988 and 1995, respectively. In 1989, he worked for the department of Electrical Engineering, Oita National College of Technology. In 1996, he worked for the Faculty of Engineering, Iwate University and was a Professor of Iwate University since 2011. During 2000-2001, he was with McMaster University, Hamilton, ONT, Canada, as a Visiting Scientist.

His current research interests include pulsed power technologies such as plasma generation based on solid materials, environmental agricultural applications. Typically, he has experienced studies of shunting arcs and pulsed-ion technology such as ion implantation into three-dimensional components, exhaust gas processing in atmospheric pressure such as decomposition of such as reduction of NO_x, decomposition of perfluorinated compounds (PFCs), and ozone generation. He also has research experiences of ceramics joining using exploding metal foil, transient glow discharge and atmospheric glow discharge phenomena, water remediation by streamer-like discharge under water, high-voltage stimulation on mushroom for improvement of harvest yield, surface modification technology by

plasmas at atmospheric pressure. He is co-authors of 9 books (International: 1 and domestic in Japan: 8 of which two books are appeared in an editor in chief) and 78 papers are published in international journals.

Main academic records in 2010-2011:

1 K. Takaki, I. Yagi, T. Fujiwara, T. Go, "Influence of Circuit Parameter on Ozone Synthesis Using Inductive Energy Storage System Pulsed Power Generator", IEEE Trans. Dielect. Electr. Insul., (2011) (in print). (SCI, 0.771)

2 K. Takahashi, K. Takaki, N. Satta, "Water Remediation Using Pulsed Power Discharge under Water with Advanced Oxidation Process", J. Adv. Oxid. Technol, (2011) (in print). (SCI, 0.850)

3 K. Takahashi, I. Yagi, K. Takaki, N. Satta, "Development of Pulsed Discharge inside Bubble in Water", IEEE Trans. Plasma Sci., (2011) (in print) (SCI, 1.447)

4 Yagi, S. Okada, T. Matsumoto, D. Wang, T. Namihira, K. Takaki, "Streamer Propagation of Nanosecond Pulse Discharge with Various Rise Times", IEEE Trans. Plasma Sci., (2011) (in print) (SCI, 1.447)

5 H. Fue, T. Hasegawa, T. Sato, S. Mukaigawa, K. Takaki, T. Fujiwara, "Development of self-organized filaments in a microgap atmospheric barrier discharge on bismuth silicon oxide dielectrics", IEEE Trans. Plasma Sci., (2011) (in print) (SCI, 1.447)

6 H. Aoki, K. Takahashi, K. Takaki, T. Fujiwara, "Induction of Gaseous and Metal Source Plasmas by Carbon Shunting Arc", IEEE Trans. Plasma Sci., (2011) (in print) (SCI, 1.447)

7 T. Sato, T. Hasegawa, H. Fue, S. Mukaigawa, K. Takaki, T. Fujiwara, "Self-Organization Pattern of Microgap Atmospheric Barrier Discharge", IEEE Trans. Plasma Sci., (2011) (in print) (SCI, 1.447)

8 Y. Ishigaki, T. Kasama, K. Takaki, T. Fujiwara, "Optimization of Reactor Configuration for NO_x Removal Using Magnetic Compression Pulsed Power Generator", IEEE Trans. Plasma Sci., (2011) (in print) (SCI, 1.447)

9 T. Takaki, T. Murakami, S. Mukaigawa, T. Fujiwara, K. Yukimura, "Shunting arc generation by parallel rod configuration", Plasma Sources Sci. Technol., 20(1), 015012-1-6, (2011) (SCI, 2.384)

10 K. Ise, H. Tanaka, K. Takaki, M. Wake, K. Okamura, K. Takayama, W. Jiang, "Development of Megahertz High Voltage Switching Pulse Modulator Using a SiC-JFET for an Induction Synchrotron", IEEE Trans. Plasma Sci., 39(2), 730-736 (2011) (SCI, 1.447)

11 K. Takahashi, Y. Sasaki, S. Mukaigawa, K. Takaki, T. Fujiwara, N. Satta, "Purification of High-Conductivity Water Using Gas-Liquid Phase Discharge Reactor", IEEE Trans. Plasma Sci., 38(10), 2694-2700 (2010) (SCI, 1.447)

12 K. Takaki, R. Yamaguchi, T. Kusaka, H. Kofujita, K. Takahashi, Y. Sakamoto, M. Narimatsu, K. Nagane, "Effects of Pulse Voltage Stimulation on Fruit Body Formation in Lentinula Edodes Cultivation", Int. J. Plasma Environ. Sci. Technol., 4(2), 109-113, (2010)

13 K. Takaki, T. Murakami, S. Mukaigawa, T. Fujiwara, K. Yukimura, "Production of Titanium-Containing Carbon Plasma Using Shunting Arc Discharge for Hybrid Film Deposition", Jpn. J. Appl. Phys., 49, 046001-1-5, (2010) (SCI, 1.222)

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Hideaki Yamada was born in Toyama, Japan in 1974. He received the B. Sci., M. Sci., and Dr. Sci. degrees in science and technology from Niigata University, Niigata, Japan in 1995, 1999 and 2002, respectively. From 2002 to

2004, he worked for the graduate school of energy science, Kyoto University. Then, since 2004, he has worked for National Institute of Industrial Science and Technology (AIST), Japan, as a research scientist.

His majors are mainly plasma physics, simulations and synthesis of single-crystal diamond. He has experience to conduct macroscopic simulation by using fluid model as well as microscopic simulation by using molecular dynamics simulation in the fields of not only low-temperature processing plasmas but also high-temperature nuclear fusion plasmas. In addition, he has experience to grow single-crystal diamond by using microwave plasma chemical vapor deposition and some related technologies, such as laser cutting and polishing. Recently, he developed a process to enlarge size of single-crystal diamond wafer efficiently, and succeeded in fabricating 1-inch size wafer. His current research interests includes 1) method to synthesize large size single-crystal diamond wafers, 2) cutting/polishing processing of such large wafers, 3) plasma processes for such wafers, and 4) gas-surface chemistry and dynamics of related plasma processings.

He is a member of the Japan society of Applied Physics (Plasma Electronics division), the Japan Society of Plasma Science and Nuclear Fusion Research, and New Diamond Forum.

Main academic records in 2011-2009:

1 H. Yamada, A. Chayahara, Y. Mokuno, et al., "Developments of elemental technologies to produce inch-size single crystal diamond wafers", Diamond Relat. Mater. 20 (2011), 616.

2 H. Yamada, A. Chayahara, Y. Mokuno, et al., "A model of reactive microwave plasma discharge for growth of single-crystal-diamond", *Jpn. J. Appl. Phys.* 50-1 (2011), 01AB02.

3 H. Yamada, A. Chayahara, Y. Mokuno, et al., "Fabrication of 1 inch mosaic crystal diamond wafers", *Appl. Phys. Exp.* 3, (2010) 051301.

4 Z. Feng, A. Chayahara, H. Yamada, et al., "Surface stress measurement with interference microscopy of thick homoepitaxial single-crystal diamond layers", *Diamond Relat. Mater.* 19 (2010),

5 Z. Feng, A. Chayahara, Y. Mokuno, H. Yamada, et al., "Raman spectra of a cross section of a large single crystal diamond synthesized by using microwave plasma", *Diamond Relat. Mater.* 19 (2010), 171.

6 Y. Mokuno, A. Chayahara, H. Yamada, et al., "Improvements of crystallinity of single crystal diamond plates produced by lift-off process using ion implantation", *Diamond Relat. Mater.* 19 (2010), 128.

7 H. Yamada, A. Chayahara, Y. Mokuno, et al., "Microwave plasma generated in a narrow gap to achieve high power-efficiency of growth of diamond crystals", *Diamond Relat. Mater.* 18 (2009),

8 H. Umezawa, Y. Mokuno, H. Yamada, et al., "Characterization of Schottky barrier diodes on a 0.5-inch single-crystalline CVD diamond wafer", *Diamond Relat. Mater.* 18 (2009) 208.

9 Y. Mokuno, A. Chayahara, H. Yamada, et al., "Improving purity and size of single-crystal diamond plates produced by high-rate CVD growth and lift-off process using ion implantation", *Diamond Relat. Mater.* 18 (2009), 1258.

10 Y. Mokuno, A. Chayahara, H. Yamada, et al., "Large single crystal diamond plates produced by microwave plasma CVD", *Materials Science Forum* 615-617 (2009), 991.

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Ken Yukimura received the B.Eng., M.Eng. and Dr.Eng. degrees in Electrical Engineering from Doshisha University, Kyoto, Japan in 1970, 1972 and 1977, respectively. In 1977, he worked for the faculty of Engineering, Doshisha University and was a Professor of Doshisha University since 1992. He has retired from Doshisha University on September 2009. Presently, he is an Invited Research Scientist of National Institute of Advanced Industrial Science and Technology (AIST) since January 2010. He is also an Advisory Professor of Southwest Jiaotong University,

Sichuan Province, China since June 2006 and a Contract Professor of Harbin Institute of Technology, Heilongjiang Province, China since June 2010.

His current research interests include pulsed plasma technologies such as metal plasma generation and their applications. Typically, he has experienced studies of shunting arcs and high-power pulsed sputtering glow discharges, pulsed ion technology such as ion implantation into three-dimensional components, and exhaust gas processing in atmospheric pressure such as decomposition of nitric oxide gases. He also has research experiences of exploding wire phenomena, excimer laser and vacuum ultraviolet emission technologies, ion technology and surface modification technology by plasmas at atmospheric pressure. He is co-authors of 12 books (International:6 and domestic in Japan:6 of which two books are appeared in an editor in chief) and more than 150 papers are published in international journals. Dr. Yukimura was a co-chairperson of the Fifth International Workshop on Plasma-based Ion Implantation (Kyoto, Japan, December 1999). He was a Guest Editor of a special issue relevant to Plasma-Based Surface Modification and Treatment Technologies in the *IEEE TRANSACTIONS ON PLASMA SCIENCE (IEEE TPS)* in 2005-2006 and 2008-2009, and *HIPIMS and High Power Glow Discharges* in 2009-2010.

Dr. K. Yukimura will be a Guest Editor of two special issues of *IEEE TRANSACTIONS ON PLASMA SCIENCE (IEEE TPS)* relevant to "Carbon-Related Materials Processing by Plasma Technologies", (Scheduled for July, 2012). The paper submission: November 1, 2011, and "Ion sources and their applications", (Scheduled for March, 2013), The paper submission: July 1, 2012.

Main academic records in 2009-2011:

1 K. Yukimura, A.P. Ehasarian, H. Ogiso, S. Nakano, K. Azuma, "Metal Ionization in a High-Power Pulsed Sputtering Penning Discharge", *IEEE Trans. Plasma Science*, (2011) (in print). (SCI, 1.447)

2 K. Yukimura, H. Ogiso, S. Nakano, A.P. Ehasarian, "High-Power Inductively Coupled Impulse Sputtering Glow Plasma", *IEEE Trans. Plasma Science*, (2011) (in print). (SCI, 1.447)

3 K. Azuma, R. Mieda, K. Yukimura, H. Tamagaki, T. Okimoto, "Comparative study of a high-power pulsed sputtering (HPPS) glow plasma using a Penning discharge and a hollow cathode discharge", *Surface and Coatings Technology*, (2011) (in print) (SCI, 1.860)

4 F.J. Jing, K. Yukimura, H. Kato, N. Huang, "Titanium Oxide Films Prepared by High-Power Pulsed Magnetron Sputtering", *Surface and Coatings Technology*, (2011) (in print) (SCI, 1.860)

5 K.Yukimura, A.P.Ehiasarian, “Special Issue on HIPIMS and High Power Glow Discharges”, IEEE Trans. Plasma Science, 38 (2010) 3005-3006. (SCI, 1.447)

6 F.J.Jing, K. Yukimura, Shiro Hara, Shizuka Nakano, Hisato Ogiso, Y.F.Lei, T.X.You, Y.X.Leng, “High-power pulsed magnetron sputtering glow plasma in argon gas and pulsed ion extraction”, IEEE Trans. Plasma Science, 38 (2010) 3016-3027 (SCI, 1.447).

7 K. Azuma, R.Mieda, K.Yukimura, H.Tamagaki, T.Okino,

“Electrical and optical characteristics of high-power pulsed sputtering glow discharge”, IEEE Trans. Plasma Science, 37 (2009) 1178-1188 (SCI, 1.447)

8 P.K.Chu, K.Yukimura, X.Tian, “Special Issue on Plasma-Based Surface Modification and Treatment Technologies”, IEEE Trans. Plasma Science, 37 (2009) 1121-1122. (SCI, 1.447)

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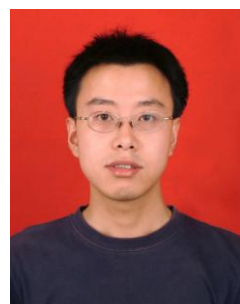
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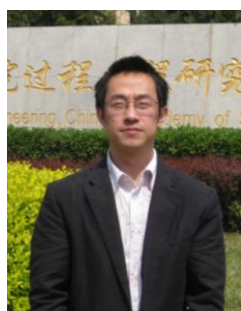
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Beijing, P. R. China as an associate professor since 2008. His current research interests include (1) low temperature plasma diagnosis; (2) mechanism of surface modification and deposition of advanced functional materials; (3) plasma applications in novel areas such as in printing and packaging industries.

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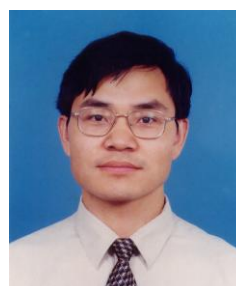
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Haixing Wang was born in Jinan, China in 1969. He received the B. Eng. and M. Eng. degrees from Shandong University in 1991 and in 1999, respectively. He received the Ph.D. degree from Tsinghua University in 2003 and as a research associate in Tsinghua University during 2003-2005, conducted

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materials processing, etc; theoretical and experimental studies on the features and mechanisms of plasma processes in electric propulsion

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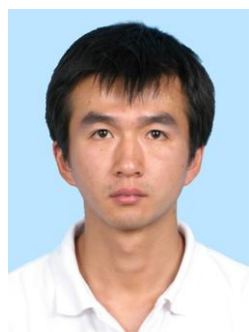
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