TOYO UNIVERSITY

Achievements

in the Bio-Nano Science Fusion Course

Graduate School of Interdisciplinary New Science

Toyo University

April 2007 – March 2014

Graduate School of Interdisciplinary New Science

Toyo University

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IdNS Toyo University

Foreword

The Doctoral Course of the Graduate School of Interdisciplinary New Science was opened in April 2007, whereas the Master Course in April 2011. Its aim is to surge ahead in life science and nanotechnology research, creating new interdisciplinary realms. We have organised international symposia and international seminars for young researchers and carried out advanced research on nanoscience/nanotechnology, bioscience/biotechnology and bio-nano fusion in collaboration with the Bio-Nano Electronics Research Centre. In this report, we summarise the achievements in the educational and research programmes during April 2007 – March 2014.

Tatsuro Hanajiri
Dean, Professor
Graduate School of Interdisciplinary New Science

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Head, Professor
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Subjects

We focus on nanoscience and nanotechnology, bioscience and biotechnology and bio-nano fusion research.

Nanoscience and nanotechnology

(a) Creation of nanostructures via top-down ultra-fine processing, and bottom-up self-organisation and self-assembly
(b) Development of nanoelectron devices
(c) Development of nano-thermostatistical mechanics

Bioscience and biotechnology

(a) Discovery and industrial application of extremophiles
(b) Applied microbiology
(c) Applied genome science

Bio-nano fusion

(a) Analysis of the interactions between biomolecules/cells, and carbon nanostructures such as fullerenes, carbon nanotubes (CNTs) and graphene
(b) Analysis of the interactions between biomolecules/cells, and nanoparticles such as ferro- and para-magnetic particles
(c) Development of bio-compatible materials
(d) Evaluation of the physical properties of biomolecules and cells by nano-micro technologies
(e) Manipulation of molecules and cells using nanoparticles and CNTs
(f) Bio-imaging and nano surgery using magnetic nanomaterials such as magnetic nanoparticles, fullerene molecules, CNTs and graphene

Outstanding research projects

We have several research projects carried out in collaboration with the Bio-Nano Electronics Research Centre. A number of advanced researchers are participating in the research projects from both overseas and Japanese research institutions.

- ✔ **21st Century's Centre of Excellence Programme (2003 – 2007)**
- ✔ **High-Tech Research Centre Programme: phase III (2006 – 2010)**
- ✔ **Programme for the Strategic Research Foundation at Private Universities (2011 – 2015)**

organised by the Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan

Academic achievements from 2007 to 2013

Bio-nano fusion research

We carried out basic studies on the fusion of bio-nano science and technology as well as individual studies of bioscience and nanotechnology and obtained remarkable results in the field of bio-nano fusion from 2007 to 2013:

1. Analysis of the interactions between biomolecules/cells, and carbon nanostructures
   (a) Creation of DNA/CNT hybrid structures and quantification of the amount of DNAs adsorbed onto CNTs.
   (b) Creation of enzyme/CNT hybrid structures and encouragement of the activity of the enzymes.
   (c) Control of the cell growth using functionalised CNTs.
   (d) Enhancement of the growth of plant using carbon nanostructures
2. Analysis of the interactions between biomolecules/cells, and magnetic particles
   (a) Capture of extremophiles by magnetic particles and growth of extremophiles on the magnetic particles.
   (b) Creation of enzyme/magnetic particle hybrids and control of enzyme reactions
   (c) Control of the cell growth using functionalised magnetic microparticles.
3. Evaluation of the physical properties of cells by nano/micro technologies.
   (a) Evaluation of the amount of immunoreactions on the surface of individual cells via the measurement of electrophoretic mobilities in microchannels.
   (b) Measurement of the mechanical properties of individual cells.
4. Manipulation of molecules and cells using nanoparticles and CNTs.
   (a) Manipulation of cell/CNT hybrids.
   (b) Manipulation of cell/magnetic particle hybrids.
   (c) Bio-imaging using bio-compatible quantum dots.
   (d) Nano surgery using bio-compatible magnetic nanoparticles.

We found that the activities of enzymes extracted from extremophiles are increased in a wide range of external conditions such as the pH and temperature due to the interactions between the enzymes and carbon nanotubes. We also discovered that the enzyme reactions can be controlled and the intermediate molecules are extracted by enzyme/magnetic particle hybrids. We visualised DNA/CNT and polypeptide/CNT hybrids with transmission electron microscope (TEM), scanning electron microscope (SEM) and atomic force microscope (AFM). We have also developed novel biosensors combining SOI, SOQ and nanotube-elecronics and examined the functions of biomolecules and cells by nano/micro electronics and technology. We are now able to perform the manipulation and sorting of living cells, which are labelled by magnetic nanoparticles or CNTs. It is also possible to manipulate cells, which are not labelled by any particles, utilising the magnetic hole effect. We have recently synthesised bio-compatible quantum dots and successfully performed imaging of targeted cells such as cancer cells.

International collaboration

We have encouraged academic interactions between bio-researchers and nano-researchers and between the Graduate School of Interdisciplinary New Science and other research institutions both overseas and in Japan. We exchanged the agreement on collaboration in the development of educational and research programmes with the following institutions and companies:

Institute for Collaborative Biotechnologies
University of California Santa Barbara, USA

School of Pharmacy and Biomolecular Sciences
University of Brighton, UK

Unité de Formation de Recherche
Université Pierre et Marie Curie (Paris 6), France

Nicole Grobert's Research Group, Department of Materials
University of Oxford, UK

Department of Mathematics and Department of Chemistry
University of Montana, USA

Indian Institute of Technology Delhi, India

Centre for Fundamental and Advanced Technical Research, Romanian Academy

– Timisoara Division, Timisoara, Romania

National Centre for Engineering of Systems with Complex Fluids
Politehnica University of Timisoara, Timisoara, Romania

Laboratory for Engineering and Applications of Nanomaterials
Rice University, USA

Laboratory for Organic Matter Physics
University of Nova Gorica, Slovania

Biophotonics and Optoelectronics Laboratory
Université de Sherbrooke, Canada

Bielefeld Institute for Biophysics and Nanoscience
University of Bielefeld, Germany

Department of Physical Chemistry and Materials Science
Budapest University of Technology and Economics, Hungary

Japan Electron and Optics Laboratory (JEOL) Ltd., Japan

Shimadzu Co., Japan

Horiba Ltd., Japan

Hitachi High-Technologies Co., Japan

Elionix Inc., Japan

Samco Inc., Japan

International activities

We organised 10 international symposia and 34 international seminars, in which doctor course students participated and gave presentations on their latest results. Young researchers discussed their ideas and results with eminent scientists in the fields of nanoscience, bioscience and bio-nano fusion. They also interacted with industrial researchers.

International symposia and forum

Name	The 5th International Symposium on Bioscience and Nanotechnology
Date	4th – 5th December 2007
Place	Prince Hotel Kawagoe, Kawagoe, Saitama, Japan
Co-organisers and supporters	University of California Santa Barbara International Centre for Young Scientists, National Institute for Materials Science French Embassy, British Council, Yumiuri Shimbun
Speakers	Toru Maekawa, Yasuhiko Yoshida, Noriyuki Doukyu, Tatsuro Hanajiri, Izumi Ichinose Sir John Walker, Daniel Morse, Rik Brydson, Nicole Grobert, Raymond Whitby, Michael Kavanaugh, Ian Kinloch, Martin Sagermann, Régine Perzynski, Henry Smith Leonid Kalachev, Stanley Parsons
Poster session	79 presentations
Industrial workshop	4 companies
Number of participants	405

Name	The 1st International Forum for the Establishment of an International Nanotechnology Innovation Centre
Date	7th December 2007
Place	Bio-Nano Electronics Research Centre, Toyo University, Kawagoe, Japan
Co-organisers and supporters	University of California Santa Barbara
Panellists	Toru Maekawa, Yasuhiko Yoshida, Noriyuki Doukyu, Tatsuro Hanajiri, Hisao Morimoto Sakthi Kumar, Daniel Morse, Rik Brydson, Nicole Grobert, Raymond Whitby Michael Kavanaugh, Ian Kinloch, Martin Sagermann, Régine Perzynski, Leonid Kalachev
Industrial workshop	4 companies
Number of participants	44

Name	The 6th International Symposium on Bioscience and Nanotechnology
Date	7th November 2008
Place	Inoue Enryo Hall, Hakusan Campus, Toyo University, Japan
Co-organisers and supporters	American Army International Technology Center – Pacific Institute for Collaborative Biotechnologies, University of California Santa Barbara American Embassy, French Embassy, British Council Japan Electron Optics Laboratory Ltd., Asylum Technology Co. Ltd., Asylum Research MediaSite K.K., Yomiuri Shimbun
Speakers	Toru Maekawa, Daniel Morse, Noriyuki Doukyu, Tatsuro Hanajiri, Yasuhiko Yoshida Masahiro Ito, Vincent Dupuis, Igor Mezic, Birgit Schwenzer, Eric Falcon, Ian Kinloch M.R. Anantharaman, Leonid Kalachev, Kashim Sader, Ian Kinloch, Aileen Morse Martin Sagermann
Poster session	60 presentations
Number of participants	258

Name	The 7th International Symposium on Bioscience and Nanotechnology
Date	20th – 21st November 2009
Place	Inoue Enryo Hall, Hakusan Campus, Toyo University, Japan
Co-organisers and supporters	Institute for Collaborative Biotechnologies, University of California Santa Barbara American Embassy, French Embassy, British Council, Indian Embassy Japan Electron Optics Laboratory Ltd., Asylum Technology Co. Ltd. Asylum Research Co. Ltd., Shimadzu Co., Yomiuri Shimbun
Speakers	Toru Maekawa, Daniel Morse, Toshifumi Okubo, Ian Kinloch, Hiroaki Higashibata Raymond Whitby, Jean-Marc di Meglio, Teruaki Hasegawa, Régine Perzynski Aileen Morse
Poster session	66 presentations
Number of participants	432

Name	The 8th International Symposium on Bioscience and Nanotechnology
Date	17th – 18th December 2010
Place	Inoue Enryo Hall, Hakusan Campus, Toyo University, Japan
Co-organisers and supporters	American Army International Technology Center – Pacific Institute for Collaborative Biotechnologies, University of California Santa Barbara American Embassy, French Embassy, British Council, Canadian Embassy Délégation générale du Québec à Tokyo, Alberta Japan Office Ontario International Marketing Centre in Tokyo Japan Electron Optics Laboratory Ltd., Asylum Technology Co. Ltd. Asylum Research Co. Ltd., Shimadzu Co.
Speakers	Toru Maekawa, Sakthi Kumar, Daniel Morse, Pulickel Ajayan , Martin Sagermann Aileen Morse, Vincent Dupuis, Nicole Grobert, Siân Fogden Ortrud Aschenbrenner, Leyla Soleymani, Larry Unsworth, Leonie Rouleau, Paul Charette
Poster session	80 presentations
Number of participants	420

Name	125th Anniversary: International Symposium The Role of Science, Technology and Education for the Realisation of the Wealthy Society and Peaceful World
Date	19th September 2011
Place	Nikkei Hall, Tokyo, Japan
Co-organisers and supporters	British Council, Japan Electron Optics Laboratory Ltd., Asylum Technology Co. Ltd. Asylum Research, Shimadzu Co., Horiba Ltd.
Speakers	Sir Harry Kroto, George Hara, Toru Maekawa, Makio Takemura, Ichiro Tai
Number of participants	480

Name	125th Anniversary: International Symposium The 9th International Symposium on Bioscience and Nanotechnology
Date	10th December 2011
Place	721 Lecture Room, Kawagoe Campus, Toyo University, Japan
Co-organisers and supporters	Indian Embassy Japan Electron Optics Laboratory Ltd., Asylum Technology Co. Ltd. Asylum Research Co. Ltd., Shimadzu Co., Horiba Co., Hitachi High-Technologies Co.
Speakers	Toru Maekawa, , Chadaram Sivaji, Noriyuki Doukyu, Yoshikata Nakajima Yutaka Nagaoka, Takahiro Fukuda, Adarsh Sandhu, Renu Wadhwa, Sudhasatwa Basu Prashant Mishra, Joby Joseph, Vamsi K. Krishna, Sundara Ramaprabhu
Poster session	67 presentations
Number of participants	300

Name	125th Anniversary: International Symposium The Role of Science, Technology and Education for the Realisation of the Wealthy Society and Peaceful World
Date	17th November 2012
Place	Nikkei Hall, Tokyo, Japan
Co-organisers and supporters	Japan Electron Optics Laboratory Ltd., Asylum Technology Co. Ltd., Asylum Research, Shimadzu Co., Horiba Ltd., Hitachi High-Technologies Co., Elionix Inc., Samco Inc.
Speakers	Daniel Morse, Koki Horikoshi, Toru Maekawa
Poster session	80 presentations
Number of participants	550

Name	125th Anniversary: International Symposium The 10th International Symposium on Bioscience and Nanotechnology 60th Anniversary Celebrations of Japan-India Diplomatic Relations
Date	7th – 8th December 2012
Place	Inoue Enryo Hall, Hakusan Campus, Toyo University, Japan
Co-organisers and supporters	Indian JSPS Alumni Association (IJAA) Embassy of India Japanese Society for the Promotion of Science (JSPS) Japan Electron Optics Laboratory Ltd., Asylum Technology Co. Ltd., Asylum Research, Shimadzu Co., Horiba Ltd., Hitachi High-Technologies Co., Elionix Inc., Samco Inc.
Speakers	Deepa Gopalan Wadhwa (Ambassador of India to Japan) Hayashi Towatari (Executive Director,JSPS) Toru Maekawa, D. Sakthi Kumar, Makoto Kobayashi, R. Chidambaram, Chadaram Sivaji, Kenji Oeda, Neeraj Khare, Armin Gölzhäuser, Kunio Hayakawa, P. V. Mohanan, Sumio Iijima, A. Jayakrishnan, K. Sathyamoorthy, Jose Mon Jacob, Hiroyuki Takei, Satish Rao, Satyen Saha
Poster session	88 presentations
Number of participants	400

Name	The 11th International Symposium on Bioscience and Nanotechnology
Date	15th November 2013
Place	Inoue Enryo Hall, Hakusan Campus, Toyo University, Japan
Co-organisers and supporters	Japan Electron Optics Laboratory Ltd., Asylum Technology Co. Ltd., Asylum Research, Shimadzu Co., Horiba Ltd., Hitachi High-Technologies Co., Elionix Inc., Samco Inc.
Speakers	Sir Harry Kroto, Raymond L.D. Whitby, Régine Perzynski, Murukeshan Vadakke Matham, B.R. Mehta, Krisztina László, Leonid Kalachev, Mohan V. Jacob, Chris Ewels, P.V. Mohanan
Poster session	66 presentations
Number of participants	300

International seminars at overseas institutions

Name	Toyo–ICB International Seminar
Date	6th – 8th August 2007
Place	Institute for Collaborative Biotechnologies University of California, Santa Barbara, USA
Speakers	Toru Maekawa, Yasuhiko Yoshida, Tatsuro Hanajiri, Toru Toyabe Toshifumi Okubo, Hisao Morimoto, Sakthi Kumar, Nirky Rantonen Noriyuki Doukyu, Norio Shimizu, Masahiro Ito, Hiroki Higashibata Daniel Morse, Guillermo Bazen, James Cooper, Deborah Fygenson, David Gay Jacob Israelachvili, Luc Jaeger, Kenneth Kosik, Carl Meinhart, Igor Mezic Aileen Morse, Stanley Parsons, Norbert Reich, Martin Sagermann Birgit Schwenzer, Galen Stucky, Kimberly Turner
Number of participants	65

Name	Toyo–Asylum International Seminar
Date	9th August 2007
Place	Asylum Research Santa Barbara, USA
Speakers	Toru Maekawa, Jason Cleveland (CEO) Roger Proksch (President), John Green (Vice-President) Iréne Revenko, Nick Geisse, Sophia Hohlbauch, Alejandro Bonilla
Number of participants	32

Name	Bio-Nano Electronics Research Centre – Indian Institute of Technology Delhi International Seminar on Nanotechnology
Date	2nd – 3rd August 2011
Place	Indian Institute of Technology Delhi Delhi, India
Speakers	Toru Maekawa, Noriyuki Doukyu, D. Sakthi Kumar, Shosaku Kashiwada, Takashi Uchida Bodh Raj Mehta, Ashok Kumar Ganguli, Suddhasatwa Basu, Sudipto Mukherjee Joby Joseph
Number of participants	56

Name	Bio-Nano Electronics Research Centre – Indian Institute of Technology Delhi International Seminar on Nanotechnology
Date	10th August 2012
Place	Indian Institute of Technology Delhi Delhi, India
Speakers	Toru Maekawa, D. Sakthi Kumar, Bodh Raj Mehta, Joby Joseph
Number of participants	25

Name	Inaugural Workshop on Bio-Nano Electronics Research Centre, Toyo University – Nanotechnology Research Facilities, IIT Delhi Research Collaboration Programme
Date	8th August 2013
Place	Indian Institute of Technology Delhi Delhi, India
Speakers	Shinji Fukukawa, Makio Takemura, Toru Maekawa, D. Sakthi Kumar, Suneet Tuli S.N. Singh, T. Ramasam, Shevagaonkar
Number of participants	120

International seminars at the Kawagoe Campus

Name	International Seminar: Synthesis of Functional Polymers and Their Application to Bioscience and Nanotechnology
Date	8th April 2007
Speaker	Kailasam Varadharajan, University of Montana, USA
Number of participants	55

Name	International Seminar: One Researcher's Trajectory
Date	28th June 2007
Speaker	Koki Horikoshi, JAMSTEC, Japan
Number of participants	102

Name	International Seminar: Development of Biomaterials
Date	15th August 2007
Speakers	Ramakrishnan Baskaran, Indira Gandhi Centre for Atomic Research, India
Number of participants	10

Name	International Seminar: AFM imaging
Date	27th August 2007
Speaker	Sophia Hohlbauch, Asylum Research, USA
Number of participants	22

Name	International Seminar: Overview of Bio Research in France
Date	7th September 2007
Speaker	Reiko Oda, Institut Européan de Chimie et Biologie, Université Bordeaux, France
Number of participants	10

Name	International Seminar: Biologically Inspired Low Temperature Route to Improved Electronic Materials
Date	18th September 2007
Speaker	Birgit Schwenzer, University of California Santa Barbara, USA
Number of participants	95

Name	International Seminar: Creation of Nanoparticles in Microfluidic Devices
Date	9th November 2007
Speaker	Ali Abou Hassan, Université Pierre et Marie Curie (Paris 6), France
Number of participants	48

Name	International Seminar: Electron Cyclotron Resonance Ion Beam
Date	6th December 2008
Speakers	Toru Maekawa, Takashi Uchida, Arne G. Drentje, Sandor Biri, Takahide Nagakawa Masayuki Muramatsu, Tetsuhiko Yorita, Kiyokatsu Tanaka, Wataru Takasugi Takeyoshi Watanabe, Yoshiaki Hirai, Osamu Kutsumi, Yuuki Matsui
Number of participants	110

Name	International Seminar: Control of Biochemical Reactions and Neuron Growth
Date	19th December 2008
Speakers	Michael Kavanaugh, Leonid Kalachev, University of Montana, USA
Number of participants	95

Name	International Seminar: Creation of Fibres Composed of Carbon Nanotubes
Date	22nd December 2008
Speakers	Young Jun Park, Yong Hyup Kim, Seol Nantional University, Korea
Number of participants	75

Name	International Seminar: Carbon Nanomaterials for Next-Generation Interconnects and Passives: Physics, Status and Prospects
Date	21st January 2009
Speaker	Kaustav Banerje, University of California Santa Barbara, USA
Number of participants	85

Name	International Seminar: 2D Assemblies of Functionalized Nanoparticles for Applications in Magnetism
Date	30th January 2009
Speaker	Benoit P. Pichon, Université Strasburg, France
Number of participants	40

Name	International Seminar: CMOS integrable platform for general bio sensors and possible extension to signal transmission devices
Date	16th March 2009
Speaker	Young June Park, Seoul National University, Korea
Number of participants	35

Name	International Seminar: Epigenetics, Diet and Cancer Prevention
Date	2nd July 2009
Speaker	Roderick H. Dashwood, Oregon State University, USA
Number of participants	72

Name	International Seminar: Bio-Nano Fusion Technology
Date	29th July 2010
Speakers	Toru Maekawa, Yasuo Koide, Takashi Hasumura, Atsushi Aki, Takashi Minowa Naoki Ikeda
Number of participants	34

Name	International Seminar: Fabrication and Imaging of 2D Nanomembranes and Graphene using Electron and Helium
Date	16th February 2011
Speaker	Armin Gölzhäuser, Bielefeld University, Germany
Number of participants	55

Name	International Seminar: Nano structured electrocatalysts for direct hydrocarbon fuel cell
Date	15th September 2011
Speaker	Suddhasatwa Basu, Indian Institute of Technology Delhi, India
Number of participants	15

Name	International Seminar: Creation of novel carbon composites
Date	11th May 2012
Speaker	Krisztina László , Budapest University of Technology and Economics, Hungary
Number of participants	30

Name	International Seminar: Application of COMSOL multiphysics in bionanotechnology
Date	28th May 2012
Speaker	Bjorn Sjordin, Vice-President, COMSOL, US
Number of participants	16

Name	International Seminar: Structure, aggregation and self-assembly of biological molecules-peptides, membrane active drugs and lipids in relation to their function
Date	5th June 2012
Speaker	Professor Kalpathy R.K. Eswaran, Indian Institute of Science, India
Number of participants	45

Name	International Seminar: High density holographic data storage and search
Date	8th June 2012
Speaker	Professor Joby Joseph, Indian Institute of Technology Delhi, India
Number of participants	54

Name	International Seminar: Phase engineered interference lithography for complex photonic structure fabrication
Date	15th June 2012
Speaker	Professor Joby Joseph, Indian Institute of Technology Delhi, India
Number of participants	60

Name	International Seminar: Creation of carbon nanostructures
Date	24th July 2012
Speakers	Khershed Cooper, Naval Research Laboratory, US David Kahaner, Asian Technology Information Programme, US
Number of participants	10

Name	International Seminar: Toxicology of medical devices, pharmaceutics, chemicals and regulatory studies
Date	20th September 2012
Speaker	Dr. P.V. Mohanan, Sree Chitra Tirunal Institute for Medical Sciences and Technology
Number of participants	50

Name	125th Anniversary: International Seminar Introduction to the Bio-Nano Electronics Research Centre
Date	21st November 2012
Speaker	Toru Maekawa
Number of participants	210

Name	International Seminar: Three-dimensional holography
Date	17th June 2013
Speaker	Professor Joby Joseph, Indian Institute of Technology Delhi, India
Number of participants	50

Name	International Seminar: Bio molecular nanotechnology Nano magnetic materials
Date	19th July 2013
Speakers	Professor Prashant Mishra Professor Neeraji Khare Indian Institute of Technology Delhi, India
Number of participants	65

Name	International Workshop on Academic Interactions with Top Scientists
Date	14th November 2013
Speakers	Raymond Whitby University of Brighton, Brighton, UK Régine Perzynski Université Pierre et Marie Curie (Paris 6), Paris, France Murukeshan V. Matham Nanyang Technological University, Singapore B.R. Mehta Indian Institute of Technology, Delhi, India Krisztina Lásló Budapest University of Technology and Economics, Budapest, Hungary Leonid Kalachev University of Montana, Missoula, USA Mohan V. Jacob James Cook University, Australia Chris Ewels Université de Nantes, Nantes, France P.V. Mohanan Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum, India
Number of participants	90

Name	International Seminar: Materials science of atomic layers 2D electronics: Graphene and beyond
Date	27th March 2014
Speakers	Professor Pulickel Ajayan Rice University, Houston, USA Professor Kaustav Banerjee University of California Santa Barbara, Santa Barbara, USA
Number of participants	85

Sir Harry Kroto's international seminar for young scientists

Name	Sir Harold Kroto's International Seminar for Young Scientists
Date	22nd September 2007
Place	Kawagoe Campus, Toyo University, Japan
Speaker	Sir Harold Kroto, Florida State University, USA
Number of participants	76

Name	Sir Harold Kroto's International Seminar for Young Scientists
Date	18th July 2008
Place	Kawagoe Campus, Toyo University, Japan
Speaker	Sir Harold Kroto, Florida State University, USA
Number of participants	128

Name	Sir Harold Kroto's International Seminar for Young Scientists
Date	8th October 2009
Place	Kawagoe Campus, Toyo University, Japan
Speaker	Sir Harold Kroto, Florida State University, USA
Number of participants	183

Name	Sir Harold Kroto's International Seminar for Young Scientists
Date	21st August 2010
Place	Hotel New Otani Nagaoka, Nagaoka, Japan
Speaker	Sir Harold Kroto, Florida State University, USA
Number of participants	180

Name	International Workshop on Academic Interaction with Sir Harry Kroto
Date	21st November 2013
Place	International Seminar Room, Bio-Nano *Annex*: *Beta*, Kawagoe Campus, Toyo University, Kawagoe, Japan
Panellist	Sir Harold Kroto, Florida State University, USA
Number of participants	120

Seminars for industries

Name	Academia – Industries Collaborative Seminar
Date	6th June 2007
Place	Gunma Industrial Technology Centre, Gunma, Japan
Speakers	Toru Maekawa, Yasuhiko Yoshida, Tatsuro Hanajiri, Yasuo Wada, Kiyoshi Miyashita
Number of participants	50

Name	Academia – Industries Collaborative Seminar
Date	29th June 2007
Place	Saitama Industrial Technology Centre, Saitama, Japan
Speakers	Toru Maekawa, Yasuhiko Yoshida, Tatsuro Hanajiri, Yasuo Wada, Shigeto Ogino
Number of participants	50

Name	Academia – Industries Collaborative Seminar
Date	29th September 2008
Place	Kawagoe Campus, Toyo University, Japan
Speakers	Toru Maekawa, Yasuhiko Yoshida, Yasuo Wada, Yoshikazu Yoshida, Toru Iuchi Tatsuya Tominaga
Number of participants	95

Name	Academia – Industries Collaborative Seminar
Date	17th November 2008
Place	Tokyo Metropolitan Small and Medium Enterprise Support Centre Tokyo Metropolitan Industrial Technology Research Institute, Tokyo, Japan
Speakers	Toru Maekawa, Yasuhiko Yoshida, Yasuo Wada, Tatsuro Hanajiri
Number of participants	44

Name	Academia – Industries Collaborative Seminar
Date	28th September 2009
Place	Saitama Industrial Technology Centre, Saitama, Japan
Speakers	Toru Maekawa, Yasuhiko Yoshida, Yoshikazu Yoshida, Yasuo Wada, Kazuo Furuya Yasuo Koide, Hirokazu Shimizu
Number of participants	55

Name	Academia – Industries Collaborative Seminar
Date	1st March 2010
Place	Tokyo Metropolitan Small and Medium Enterprise Support Centre Tokyo Metropolitan Industrial Technology Research Institute, Tokyo, Japan
Speakers	Toru Maekawa, Yasuhiko Yoshida, Yasuo Wada, Kazuo Furuya, Atsushi Aki
Number of participants	30

Name	Academia – Industries Collaborative Seminar
Date	21st September 2010
Place	Kawagoe Campus, Toyo University, Japan
Speakers	Toru Maekawa, Tetsuji Noda, Nobutaka Hanagata, Yasuhiko Yoshida, Yasuo Wada Atsushi Aki, Tatsuya Tominaga, Hideki Kurihara
Number of participants	54

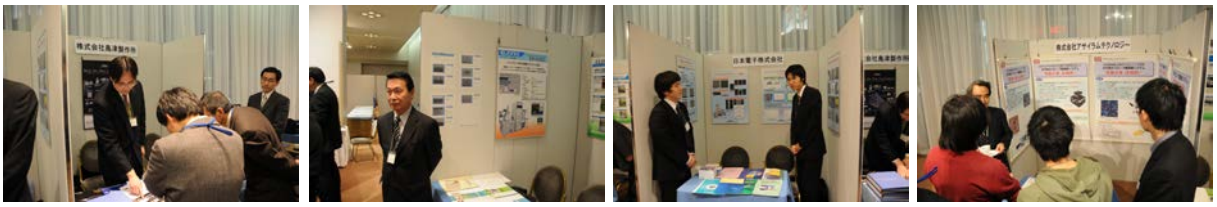
Name	Academia – Industries Collaborative Seminar
Date	12th November 2010
Place	Hakusan Campus, Toyo University, Japan
Speakers	Toru Maekawa, Takuo Sugano, Koki Horikoshi
Number of participants	80

Name	1st Bio-Nano Academia-Industries Collaborative Seminar Solution Seminar for Food Analysis: Towards the development of safe food
Date	20th January 2012
Place	Hakusan Campus, Toyo University, Japan
Speakers	Toru Maekawa, 10 JEOL researchers
Number of participants	80

11th International Symposium on Bioscience and Nanotechnology

15th November 2013

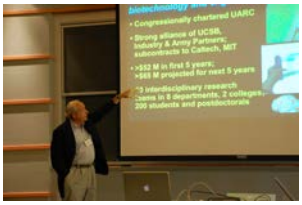
Inoue Enryo Hall, Hakusan Campus, Toyo University, Tokyo, Japan



Industrial workshops

International Forum for the Establishment of an International Nanotechnology Innovation Centre

December 2007

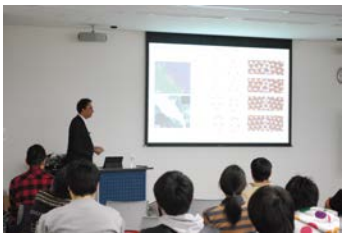



Toyo - UCSB International Seminar
Santa Barbara, California, USA, August 2007
Toyo - Asylum Research International Seminar
Santa Barbara, California, USA, August 2007



Toyo – Indian Institute of Technology Delhi
International Seminar
Delhi, India, August 2011



International Seminars
Kawagoe Campus, Toyo University
November 2013

Sir Harold Kroto's International Seminars
Kawagoe Campus, Toyo University
2007 – 2013

Scientific papers (2007 – March 2014)

1. L.V. Nair, Y. Nagaoka, T. Maekawa, D.S. Kumar and S. Jayasree, Quantum dot tailored to single wall carbon nanotube: A multifunctional hybrid nanoconstruct for cellular imaging and targeted photothermal therapy, *Small* (2014), at press.
2. S.M. Mohamed, S. Veeranarayanan, A.C. Poulose, Y. Nagaoka, H. Minegishi, Y. Yoshida, T. Maekawa and D.S. Kumar, Ribotoxin-curcin conjugated biogenic gold nanoparticles for a multimodal therapeutic approach towards brain cancer, *Biochim. Biophys. Acta-Gen. Subj.* **1840**, 1657-1669 (2014).
3. A. Baliyan, Y. Nakajima, T. Fukuda, T. Uchida, T. Hanajiri and T. Maekawa, Synthesis of an ultradense forest of vertically aligned triple-walled carbon nanotubes of uniform diameter and length using hollow catalytic nanoparticles, *J. Am. Chem. Soc.* **136**, 1047-1053 (2014).
4. S. Balasubramanian, A.R. Girija, Y. Nagaoka, M. Suzuki, T. Fukuda, Y. Yoshida, T. Maekawa and D.S. Kumar, Curcumin and 5FU loaded, folate and transferrin decorated polymeric magnetic nanoformulation: A synergistic cancer therapeutic approach, accelerated by magnetic hyperthermia, *Int. J. Nanomed.* **9**, 437-459 (2014).
5. S. Balasubramanian, A.R. Girija, R. Sreejith, Y. Nagaoka, S. Iwai, M. Suzuki, T. Fukuda, T. Hasumura, Y. Yoshida, T. Maekawa and D.S. Kumar, Bacterial exopolysaccharide based magnetic nanoparticles: A versatile nanotool for cancer cell imaging, targeted drug delivery and synergistic effect of drug and hyperthermia mediated cancer therapy, *J. Biomed. Nanotechnol.* **10**, 885-899 (2014).
6. R. Romero-Aburto, T.N. Narayanan, Y. Nagaoka, T. Hasumura, T.M. Mitcham, T. Fukuda, P.J. Cox, R.R. Bouchard, T. Maekawa, D.S. Kumar, S.V. Torti, S.A. Mani and P.M. Ajayan, Fluorinated graphene oxide; a new multimodal material for biological applications, *Adv. Mater.* **25**, 5632–5637 (2013).
7. S. Balasubramanian, A.R. Girija, Y. Nagaoka, S. Iwai, K. Venugopal, K. Kato, Y. Yoshida, T. Maekawa and D.S. Kumar, Aptamer conjugated theragnostic multifunctional magnetic nanoparticles as a nano platform for pancreatic cancer therapy, *RSC Adv.* **3**, 20579-20598 (2013).
8. Y. Katsube, T. Fukuda and T. Maekawa, Synthesis of magnetic carbon nanotubes: Functionalisation of carbon nanotubes with nickel/sulphur nanoparticles via self-assembly in near-critical acetone, *J. Supercrit. Fluids* **83**, 1-5 (2013).
9. S. Raveendran, V. Palaninathan, N. Chauhan, Y. Sakamoto, Y. Yoshida, T. Maekawa, P.V. Mohanan and D.S. Kumar, *In vitro* evaluation of antioxidant defense mechanism and hemocompatibility of mauran, *Carbohydr. Polym.* **98**, 108-115 (2013).
10. S. Raveendran, N. Chauhan, Y. Nakajima, H. Toshiaki, S. Kurosu, Y. Tanizawa, R. Tero, Y. Yoshida, T. Hanajiri, T. Maekawa, P.M. Ajayan, A. Sandhu and D.S. Kumar, Eco friendly route for synthesis of highly conductive graphene using extremophiles for green electronics and bioscience, *Part. Part. Syst. Charact.* **30**, 573-578 (2013).
11. P. Jeyamohan, T. Hasumura, Y. Nagaoka, Y. Yoshida, T. Maekawa and D. S. Kumar, Accelerated killing of cancer cells using multifunctional SWCNTs based system for targeted drug delivery in combination with photothermal therapy, *Int. J. Nanomed.* **8**, 2653-2667 (2013).
12. A. Aravind, R. Nair, S. Raveendran, S. Veeranarayan, Y. Nagaoka, T. Fukuda, T. Hasumura, H. Morimoto, Y. Yoshida, T. Maekawa and D.S. Kumar, Aptamer conjugated paclitaxel and magnetic fluid loaded fluorescently tagged PLGA nanoparticles for targeted cancer therapy, *J. Magn. Magn. Mater.* **344**, 116-123 (2013).
13. S. Raveendran, Y. Yoshida, T. Maekawa and D.S. Kumar, Pharmaceutically versatile sulfated polysaccharide based bionano platforms, *Nanomed.: Nanotechnol. Biol. Med.* **9**, 605-626 (2013).
14. T. Mizuki, M. Sawai, Y. Nagaoka, H. Morimoto and T. Maekawa, Activity of lipase and chitinase immobilized on superparamagnetic particles subjected to a rotational magnetic field, *PLoS One* **8**, e66528 (2013).
15. R.L.D. Whitby, A.V. Korobeinyk, V.M. Gun'ko, D.B. Wright, G. Dichello, L.C. Smith, T. Fukuda, T. Maekawa, J.R. Thorpe, and S.V. Mikhalovsky, Single layer graphenes functionalized with polyurea: Architectural control and biomolecule reactivity, *J. Phys. Chem. C* **117**, 11829–11836 (2013).
16. A. Baliyan, T. Fukuda, Y. Hayasaki, T. Uchida, Y. Nakajima, T. Hanajiri and T. Maekawa, $CoFe_2O_4$ nanoparticles as a catalyst: synthesis of a forest of vertically aligned CNTs of uniform diameters by plasma-enhanced CVD, *J. Nanopart. Res.* **15**, 1693 (2013).
17. S. Kurosu, T. Fukuda and T. Maekawa, Quick synthesis of highly aligned or randomly oriented nano fibrous structures composed of C_{60} molecules via self-assembly, *Adv. Nat. Sci.: Nanosci. Nanotechnol.* **4**, 025003 (2013).
18. S. Balasubramanian, A.R. Girija, Y. Nagaoka, M. Suzuki, T. Fukuda, Y. Yoshida, T. Maekawa and D.S. Kumar, Multifunctional Carboxymethyl cellulose based magnetic nanovector as theragnostic system for folate receptor targeted chemotherapy, imaging and hyperthermia against cancer, *Langmuir* **29**, 3453-3466 (2013).

19. A. Baliyan, Y. Hayasaki, T. Fukuda, T. Uchida, Y. Nakajima, T. Hanajiri and T. Maekawa, Precise control of the number of walls of CNTs of a uniform internal diameter, *J. Phys. Chem. C* **117**, 683-686 (2013).
20. S. Raveendran, B. Dhandayuthapani, Y. Nagaoka, Y. Yoshida, T. Maekawa and D.S. Kumar, Biocompatible nanofibers based on extremophilic bacterial polysaccharide from Halomonoas maura, *Carbohydr. Polym.* **92**, 1225-1233 (2013).
21. S. Raveendran, A.C. Poulose, Y. Yoshida, T. Maekawa and D.S. Kumar, Bacterial exopolysaccharide based nanoparticles for sustained drug delivery, cancer chemotherapy and bioimaging, *Carbohydr. Polym.* **91**, 22-32 (2013).
22. T. Yamada, S. Abe, Y. Nakajima, T. Hanajiri, T. Toyabe and T. Sugano, Quantitative extraction of electric flux in the buried-oxide layer and investigation of its effects on MOSFET characteristics, *IEEE Trans. Electron Devices* **60**, 3996-4001 (2013).
23. T. Yamada, Y. Nakajima, T. Hanajiri and T. Sugano, Suppression of drain-induced barrier lowering in silicon-on-insulator MOSFETs through source/drain engineering for low-operating-power system-on-chip applications, *IEEE Trans. Electron Devices* **60**, 4281-4283 (2013).
24. T. Yamada, Y. Nakajima, T. Hanajiri and T. Sugano, Suppression of drain-induced barrier lowering in silicon-on-insulator MOSFETs through source/drain engineering for low-operating-power system-on-chip applications, *IEEE Trans. Electron Devices* **60**, 260-267 (2013).
25. H. Minegishi, Y. Yamauchi, A. Echigo, Y. Shimane, M. Kamekura, T. Itoh, M. Ohkuma and R. Usami, *Halarchaeum nitratireducens* sp nov., a moderately acidophilic haloarchaeon isolated from commercial sea salt, *Int. J. Syst. Evol. Micr.* **63**, 4202-4206 (2013).
27. H. Minegishi, Y. Shimane, A. Echigo, Y. Ohta, Y. Hatada, M. Kamekura, T. Maruyama and R. Usami, Thermophilic and halophilic beta-agarase from a halophilic archaeon *Halococcus* sp. 197A, *Extromophiles* **17**, 931-939 (2013).
28. A. Echigo, H. Minegishi, Y. Shimane, M. Kamekura T. Itoh and R. Usami, *Halomicroarcula pellucida* gen. nov., sp nov., a non-pigmented, transparent-colony-forming, halophilic archaeon isolated from solar salt, *Int. J. Syst. Evol. Micr.* **63**, 3556-3562 (2013).
29. Y. Yamauchi, H. Minegishi, A. Echigo, Y. Shimane, M. Kamekura, T. Itoh, M. Ohkuma, N. Doukyu, A. Inoue and R. Usami, *Halarchaeum rubridurum* sp. nov., a moderately acidophilic haloarchaeon isolated from commercial sea salt samples, *Int. J. Syst. Evol. Microbiol.* **63**, 3143-3147 (2013).
30. Y. Yamauchi, H. Minegishi, A. Echigo, Y. Shimane, H. Shimoshige, M. Kamekura, T. Itoh, N. Doukyu, A. Inoue and R. Usami, *Halarchaeum salinum* sp. nov., a moderately acidophilic haloarchaeon isolated from commercial sea salt, *Int. J. Syst. Evol. Microbiol.* **63**, 1138-1142 (2013).
31. Y. Shimane, S. Nagaoka, H. Minegishi, M. Kamekura, A. Echigo, Y. Hatada, T. Ito and R. Usami, *Natronoarchaeum philippinense* sp. nov., a novel haloarchaeon from commercial solar salt, *Int. J. Syst. Evol. Microbiol.* **63**, 920-924 (2013).
32. H. Shimoshige, T. Yamada, H. Minegishi, A. Echigo, Y. Shimane, M. Kamekura, T. Itoh and R. Usami, *Halobaculum magnesiiphilum* sp. nov., a magnesium dependent haloarchaeon, capable of growth in 1 % (w/v) NaCl, isolated from commercial salt, *Int. J. Syst. Evol. Microbiol.* **63**, 861-866 (2013).
34. H. Minegishi, Y. Yamauchi, A. Echigo, Y. Shimane, M. Kamekura, T. Itoh, M. Ohkuma and R. Usami, *Halarchaeum nitratireducens* sp nov., a moderately acidophilic haloarchaeon isolated from commercial sea salt, *Int. J. Syst. Evol. Micr.* **63**, 4202-4206 (2013).
35. H. Minegishi, Y. Shimane, A. Echigo, Y. Ohta, Y. Hatada, M. Kamekura, T. Maruyama and R. Usami, Thermophilic and halophilic beta-agarase from a halophilic archaeon *Halococcus* sp. 197A, *Extromophiles* **17**, 931-939 (2013).
36. A. Echigo, H. Minegishi, Y. Shimane, M. Kamekura T. Itoh and R. Usami, *Halomicroarcula pellucida* gen. nov., sp nov., a non-pigmented, transparent-colony-forming, halophilic archaeon isolated from solar salt, *Int. J. Syst. Evol. Micr.* **63**, 3556-3562 (2013).
37. Y. Yamauchi, H. Minegishi, A. Echigo, Y. Shimane, M. Kamekura, T. Itoh, M. Ohkuma, N. Doukyu, A. Inoue and R. Usami, *Halarchaeum rubridurum* sp. nov., a moderately acidophilic haloarchaeon isolated from commercial sea salt samples, *Int. J. Syst. Evol. Microbiol.* **63**, 3143-3147 (2013).
38. Y. Yamauchi, H. Minegishi, A. Echigo, Y. Shimane, H. Shimoshige, M. Kamekura, T. Itoh, N. Doukyu, A. Inoue and R. Usami, *Halarchaeum salinum* sp. nov., a moderately acidophilic haloarchaeon isolated from commercial sea salt, *Int. J. Syst. Evol. Microbiol.* **63**, 1138-1142 (2013).
39. Y. Shimane, S. Nagaoka, H. Minegishi, M. Kamekura, A. Echigo, Y. Hatada, T. Ito and R. Usami, *Natronoarchaeum philippinense* sp. nov., a novel haloarchaeon from commercial solar salt, *Int. J. Syst. Evol. Microbiol.* **63**, 920-924 (2013).
40. H. Shimoshige, T. Yamada, H. Minegishi, A. Echigo, Y. Shimane, M. Kamekura, T. Itoh and R. Usami, *Halobaculum magnesiiphilum* sp. nov., a magnesium dependent haloarchaeon, capable of growth in 1 % (w/v) NaCl, isolated from commercial salt, *Int. J. Syst. Evol. Microbiol.* **63**, 861-866 (2013).
41. M. Sheikh, A. Baliyan, S. Veeranarayanan, A.C. Poulose, Y. Nagaoka, H. Minegishi, Y. Yoshida, T.

Maekawa and D.S. Kumar, Non-destrucitve harvesting of biogenic gold nanoparticles from japtropha curcas seed meal and shell extracts and their application as bio-diagnostic photothermal ablaters-lending shine to bio diesel byproducts, *Nanomater. Environ.* **1**, 3–17 (2012).

42. A. Aravind, S.H. Varghese, S. Veeranarayanan, A. Mathew, Y. Nagaoka, T. Fukuda, T. Hasamura, S. Iwai, Y. Yoshida, T. Maekawa and D.S. Kumar, Aptamer labelled PLGA nanoparticles for targeting cancer cells, *Cancer Nanotechnol*. **3**, 1-12 (2012).
43. A. Aravind, Y. Yoshida, T. Maekawa and D. Sakthi Kumar, Aptamer conjugated polymeric nanoparticles for targeted cancer therapy, *Drug Del. Transl. Res.* **2**, 418-436 (2012).
44. S. Veeranarayanan, A.C. Poulose, M.S. Mohamed, S.H. Varghese, Y. Nagaoka, Y. Yoshida, T. Maekawa and D.S. Kumar, Synergistic targeting of cancer and associated angiogenesis exercising triple targeted-dual drug silica nanoformulations for theragnostics, *Small* **8**, 3476-3489 (2012).
45. A. Aravind, A. Prashanti, R.D. Nair, S. Veeranarayanan, Y. Nagaoka, Y. Yoshida, T. Maekawa and D.S. Kumar, AS1411 aptamer tagged PLGA-lecithin-PEG nanoparticles for tumor cell targeting and drug delivery, *Biotechnol. Bioeng.* **109**, 2920-2931 (2012).
46. O. Aschenbrenner, T. Fukuda, T. Hasumura, T. Maekawa, V.M. Gun'ko, S.V. Mikhalovsky, A.B. Cundy, R.L.D. Whitby, Creation of 3-dimensional carbon nanostructures from UV irradiation of carbon dioxide at room temperature, *J. Supercrit. Fluids* **72**, 1-6 (2012).
47. Y. Hayasaki, T. Fukuda, T. Hasumura and T. Maekawa, Creation of metal-containing carbon onions via self-assembly in metallocene/benzene solution irradiated with an ultraviolet laser, *Adv. Nat. Sci.: Nanosci. Nanotechnol.* **3**, 035010 (2012).
48. S. Veeranarayanan, A.C. Poulose, M.S. Mohamad, Y. Nagaoka, S. Iwai, Y. Nakagame, S. Kashiwada, Y. Yoshida, T. Maekawa, D.S. Kumar, Synthesis and application of luminescent single CdS quantum dot encapsulated silica nanoparticles directed for precision optical bioimaging, *Int. J. Nanomed.* **7**, 3769-3786 (2012).
49. R.G. Aswathy, B. Sivakumar, D. Brahatheeswaran, Y. Yoshida, T. Maekawa and D.S. Kumar, Green synthesis, characterization and in vitro biocompatibility of starch capped nanoparticles, *Adv. Sci. Lett.* **16**, 69-75 (2012).
50. R. Nair, Y. Yoshida, T. Maekawa and D.S. Kumar, Size tuning and oxygen plasma induced pore formation on silica nanoparticles, *Prog. Nat. Sci.* **22**, 193-200 (2012).
51. A.C. Poulose, S. Veeranarayanan, A. Aravind, Y. Nagaoka, Y. Yoshida, T. Maekawa and D.S. Kumar, Synthesis of $CuAlS_2$ nano crystals and its application in bioimaging, *Mater. Express* **2**, 94-104 (2012).
52. A.C. Poulose, S. Veeranarayanan, S.H. Varghese, Y. Yoshida, T. Maekawa and D.S. Kumar, Functionalized electrophoretic deposition of CdSe quantum dots onto TiO_2 electrode for photovoltaic application, *Chem. Phys. Lett.* **539-540**, 197-203 (2012).
53. R.G. Aswathy, B. Sivakumar, D. Brahatheeswaran, R. Sreejith, T. Ukai, T. Fukuda, Y. Yoshida, T. Maekawa and D.S. Kumar, Multifunctional biocompatible fluorescent carboxymethyl cellulose nanoparticles, *J. Biomater. Nanobiotechnol.* **3**, 254-261 (2012).
54. B. Dhandayuthapani, A.C. Poulose, Y. Nagaoka, T. Hasumura, Y. Yoshida, T. Maekawa and D.S. Kumar, Biomimetic smart nanocomposite: *In vitro* biological evaluation of zein electrospun fluorescent nanofiber encapsulated CdS quantum dots, *Biofabrication* **4**, 025008 (2012).
55. A. Mathew, A. Aravind, B. Dandayuthapani, F. Takahiro, Y. Nagaoka, T. Hasumura, S. Iwai, H. Morimoto, Y. Yoshida, T. Maekawa, K. Venugopal and D.S. Kumar, Amyloid-binding aptamer conjugated curcumin-PLGA nanoparticle for potential use in Alzheimer's disease, *BioNanoSci.* **2**, 83-93 (2012).
56. A.C. Poulose, S. Veeranarayanan, M. Sheikh, R. Sreejith, Y. Nagaoka, Y. Yoshida, T. Maekawa and D.S. Kumar, PEG coated biocompatible cadmium chalcogenide quantum dots for targeted imaging of cancer cells, *J. Fluoresc.* **22**, 931-944 (2012).
57. B.G. Nair, T. Fukuda, T. Mizuki, T. Hanajiri and T. Maekawa, Intracellular trafficking of superparamagnetic iron oxide nanoparticles conjugated with TAT peptide: 3-dimensional electron tomography analysis, *Biochem. Biophys. Res. Commun.* **421**, 763-767 (2012).
58. R. Nair, M.S. Mohamed, W. Gao, T. Maekawa, Y. Yoshida, P.M. Ajayan and D.S. Kumar, Effect of carbon nanomaterials on the germination and growth of rice plants, *J. Nanosci. Nanotechnol.* **12**, 2212-2220 (2012).
59. B. Dhandayuthapani, A. Mathew, R.G. Aswathy, Y. Nagaoka, K. Venugopal, Y. Yoshida, T. Maekawa and D.S. Kumar, Hybrid fluorescent curcumin loaded zein electrospun nanofibrous scaffold for biomedical applications, *Biomed. Mater.* **7**, 045001 (2012).
60. S. Veeranarayanan, A.C. Poulose, S. Mohamed, A. Aravind, Y. Nagaoka, Y. Yoshida, T. Maekawa and D.S. Kumar, FITC labeled silica nanoparticles as efficient cell tags: Uptake and photostability study in endothelial cells, *J. Fluoresc.* **22**, 537–548 (2012).
61. T. Higashi, H. Minegishi, Y. Nagaoka, T. Fukuda, A. Echigo, R. Usami, T. Maekawa and T. Hanajiri, Effects of superparamagnetic nanoparticle clusters on the polymerase chain reaction, *Appl. Sci.* **2012**, 2, 303-314 (2012).

62. R.G. Aswathy, B. Sivakumar, D. Brahatheeswaran, T. Fukuda, Y. Yoshida, T. Maekawa and D.S. Kumar, Biocompatible fluorescent zein nanoparticles for simultaneous bioimaging and drug delivery application, *Adv. Nat. Sci.: Nanosci. Nanotechnol.* **3**, 025006 (2012).
63. O. Aschenbrenner, T. Fukuda, T. Hasumura, T. Maekawa, A.B. Cundy and R.L.D. Whitby, Creation of spherical carbon nanoparticles and clusters from carbon dioxide via UV dissociation at the critical point, *Green Chem.* **14**, 1196-1201 (2012).
64. K.V. Katok, R.L.D. Whitby, T. Fukuda, T. Maekawa, I. Bezverkhyy, S.V. Mikhalovsky and A.B. Cundy, Hyperstoichiometric interaction between silver and mercury at the nanoscale, *Angew. Chem. Int. Ed.* **51**, 2632-2635 (2012).
65. A.C. Poulose, S. Veeranarayanan, Y. Yoshida, T. Maekawa and D.S. Kumar, Rapid synthesis of triangular CdS nanocrystals without any trap emission, *J. Nanopart. Res.* **14**, 789 (2012).
66. A. Mathew, T. Fukuda, Y. Nagaoka, T. Hasumura, H. Morimoto, Y. Yoshida, T. Maekawa, K. Venugopal and D.S. Kumar, Curcumin loaded-PLGA nanoparticles conjugated with Tet-1 peptide for potential use in Alzheimer's disease, *PloS One* **7**, e32616 (2012).
67. A. Baliyan, T. Uchida, T. Fukuda, Y. Nakajima, T. Hanajiri and T. Maekawa, Synthesis of a forest of double/triple walled CNTs of uniform diameters by plasma enhanced CVD using monodisperse iron oxide nanoparticles, *J. Mater. Chem.* **22**, 5277-5280 (2012).
68. B. Dhandayuthapani, S.H. Varghese, R.G. Aswathy, Y. Yoshida, T. Maekawa and D.S. Kumar, Evaluation of antithrombogenicity and hydrophilicity on Zein-SWCNT electrospun fibrous nanocomposite scaffolds, *Int. J. Biomater.* **2012**, 345029 (2012).
69. A. Aravind, S. Veeranarayanan, A.C. Poulose, R. Nair, Y. Nagaoka, Y. Yoshida, T. Maekawa and D.S. Kumar, Aptamer functionalized silica nanoparticles for targeted cancer therapy, *BioNanoSci.* **2**, 1-8 (2012).
70. A. Baliyan, T. Fukuda, T. Uchida, Y. Nakajima, T. Hanajiri and T. Maekawa, Synthesis of diameter controlled carbon nanotubes using self-assembled catalyst nanoparticles, *Chem. Phys. Lett.* **519-520**, 78-82 (2012).
71. F. Watanabe, H. Shirai, Y. Fujii and T. Hanajiri, Rapid thermal annealing of sputter-deposited ZnO/ZnO:N/ZnO multilayered structures, *Thin Solid Films* **520**, 3729-3735 (2012).
72. N. Doukyu, K. Ishikawa, R. Watanabe and H. Ogino, Improvement in organic solvent tolerance by double disruptions of proV and marR genes in Escherichia coli, *J. Appl. Microbiol.* **112**, 464-474 (2012).
73. H. Minegishi, A. Echigo, Y. Shimane, M. Kamekura, S. Tanasupawat, W. Visessanguan, and R. Usami, Halobacterium piscisalsi Yachai et al. 2008 is a later heterotypic synonym of Halobacterium salinarum Elazari-Volcani 1957, *Int. J. Syst. Evol. Microbiol.* **62**, 2160-2162 (2012).
74. A. Echigo, H. Minegishi, Y. Shimane, M. Kamekura and R. Usami, Natribacillus halophilus gen. nov., sp nov., a moderately halophilic and alkalitolerant bacterium isolated from soil, *Int. J. Syst. Evol. Microbiol.* **62**, 289-294 (2012).
75. H. Minegishi, M. Kamekura, T. Kitajima-Ihara, K. Nakasone, A. Echigo, Y. Shimane, R. Usami, T. Itoh and K. Ihara, Gene orders in the upstream of 16S rRNA genes divide genera of the family Halobacteriaceae into two groups, *Int. J. Syst. Evol. Microbiol.* **62**, 188-195 (2012).
76. F. Francis, D.K. Baby and D.S. Kumar, Poly(N-isopropylacrylamide) hydrogel: Effect of hydrophilicity on controlled release of ibuprofen at different pH, *J. Appl. Polym. Sci.* **124**, 5079-5088 (2012).
77. T.N. Narayanan, Z. Liu, P.R. Lakshmy, W. Gao, Y. Nagaoka, D.S. Kumar, J. Lou, R. Vajtai and P.M. Ajayan, Synthesis of reduced graphene oxide-Fe_3O_4 multifunctional freestanding membranes and their temperature dependent electronic transport properties, *Carbon* **50**, 1338-1345 (2012).
78. T. Uchida, H. Minezaki, K. Oshima, R. Racz, M. Muramatsu, T. Asaji, A. Kitagawa, Y. Kato, S. Biri and Y. Yoshida, Study on the beam transport from the Bio-Nano ECRIS, *Rev. Sci. Instrum*. **83**, 02B713 (2012).
79. T. Asaji, T. Uchida, H. Minezaki, K. Oshima, R. Racz, M. Muramatsu, A. Kitagawa, Y. Kato, S. Biri and Y. Yoshida, Effect of pulse-modulated microwaves on fullerene ion production with electron cyclotron resonance ion source, *Rev. Sci. Instrum*. **83**, 02A303 (2012).
80. H. Minezaki, K. Oshima, T. Uchida, M. Muramatsu, T. Asaji, A. Kitagawa, Y. Kato, S. Biri and Y. Yoshida, Low energy Fe+ beam irradiation to C-60 thin film, *Rev. Sci. Instrum*. **83**, 02A346 (2012).
81. T. Takenaka, R. Kiriyama, M. Muramatsu, A. Kitagawa, T. Uchida, Y. Kurisu, D. Nozaki, K. Yano, Y. Yoshida, F. Sato, Y. Kato and T. Lida, Improvement of efficiency and temperature Control of induction heating vapor source on electron cyclotron resonance ion source, *Rev. Sci. Instrum*. **83**, 02A327 (2012).
82. Y. Yoshida, W. Okazaki and T. Uchida, Laser and focused ion beam combined machining for micro dies, *Rev. Sci. Instrum*. **83**, 028901 (2012).
83. R.G. Aswathy, B. Sivakumar, D. Brahatheeshwaran, T. Ukai, Y. Yoshida, T. Maekawa and D.S. Kumar, Biocompatible fluorescent jelly quantum dots for bioimaging, *Mater. Express* **1**, 291-298 (2011).
84. B. Dhandayuthapani, Y. Yoshida, T. Maekawa and D. Sakthi Kumar, Fabrication and characterization of nanofibrous scaffold developed by electrospinning, *Mater. Res.-Ibero-am. J. Mater.* **14**, 317-325 (2011).
85. R. Nair, A.C. Poulose, Y. Nagaoka, Y. Yoshida, T. Maekawa and D.S. Kumar, Uptake of FITC labeled silica

nanoparticles and quantum dots by rice seedlings: Effects on seed germination and their potential as biolabels for plants, *J. Fluoresc.* **21**, 2057-2068 (2011).

86. B.G. Nair, S.H. Varghese, R. Nair, Y. Yoshida, T. Maekawa and D.S. Kumar, Nanotechnology platforms; an innovative approach to brain tumor therapy, *Med. Chem.* **7**, 488-503 (2011).
87. R.L.D. Whitby, A. Korobeinyk, S.V. Mikhalovsky, T. Fukuda and T. Maekawa, Morphological effects of single-layer graphene oxide in the formation of covalently bonded polypyrrole composites using intermediate diisocyanate chemistry, *J. Nanopart. Res.* **13**, 4829-4837 (2011).
88. S.H. Varghese, Y. Yoshida, T. Maekawa and D.S. Kumar, Enhancement of glucose sensing behavior of cobalt tetraporphyrin (CoTpp) thin film by using single wall carbon nanotubes, *Sensor. Mater.* **23**, 335-345 (2011).
89. B. Dhandayudhapani, Y. Yasuhiko, T. Maekawa and D. Sakthi Kumar, Polymeric scaffolds in tissue engineering application - A Review, *Int. J. Polym. Sci.* **2011**, 290602 (2011).
90. T. Fukuda, Y. Katsube, N. Watabe, S. Kurosu, R.L.D. Whitby and T. Maekawa, Deposition of C_{60}, C_{70} and C_{84} fullerene molecules in benzene via a change of the fluid state from a gas-liquid two phase region to the critical point, *J. Supercrit. Fluids* **58**, 407-411 (2011).
91. A. Mathew, Y. Yoshida, T. Maekawa and D. Sakthi Kumar, Alzheimer's disease: Cholesterol a menace, *Brain Res. Bull.* **86**, 1-12 (2011).
92. Y. Nagaoka, H. Morimoto and T. Maekawa, Ordered complex structures formed by paramagnetic particles via self-assembly under an ac/dc combined magnetic field, *Langmuir* **27**, 9160-9164 (2011).
93. T. Ukai, H. Morimoto and T. Maekawa, Cluster-cluster aggregations of superparamagnetic particles in a rotational magnetic field, *Phys. Rev. E* **83**, 061406 (2011).
94. T. Higashi, Y. Nagaoka, H. Minegishi, A. Echigo, R. Usami, T. Maekawa and T. Hanajiri, Regulation of PCR efficiency with magnetic nanoparticles in a rotating magnetic field, *Chem. Phys. Lett.* **506**, 239-242 (2011).
95. M. Kojima, T. Chiba, J. Niishima, T. Higashi, T. Fukuda, Y. Nakajima, S. Kurosu, T. Hanajiri, K. Ishii, T. Maekawa and A. Inoue, Dispersion of single-walled carbon nanotubes modified with poly-L-tyrosine in water, *Nanoscale Res. Lett.* **6**, 128 (2011).
96. S. Kurosu, T. Fukuda, Y. Shibuya and T. Maekawa, Formation and reinforcement of clusters composed of C_{60} molecules, *Nanoscale Res. Lett.* **6**, 80 (2011).
97. T. Hasumura, T. Fukuda, R.L.D. Whitby, O. Aschenbrenner and T. Maekawa, Low temperature synthesis of iron containing carbon nanoparticles in critical carbon dioxide, *J. Nanopart. Res.* **13**, 53-58 (2011).
98. N. Takahashi, A. Aki, T. Ukai, Y. Nakajima, T. Maekawa and T. Hanajiri, Proposal and experimental validation of the electrophoretic Coulter method for analyzing microparticles and biological cells, *Sensor. Actuat. B: Chem.* **151**, 410-415 (2011).
99. T. Higashi, Y. Nakajima, M. Kojima, K. Ishii, A. Inoue, T. Maekawa and T. Hanajiri, Effects of poly-L-tyrosine molecules decoration on the surface properties and electron transport of SWCNTs compared to the effects of DNA molecules, *Chem. Phys. Lett.* **501**, 451-454 (2011).
100. Y. Nakajima, Y. Watanabe, T. Hanajiri, T. Toyabe and T. Sugano, Local-stress-induced trap states in SOI layers with different levels of roughness at SOI/BOX interfaces, *IEEE Electron Device Lett.* **32**, 237-239 (2011).
101. Y. Wakatsuki, K. Noda, Y. Wada, T. Toyabe and K. Matsushige, Molecular doping effect in bottom-gate, bottom-contact pentacene thin-film transistors, *J. Appl. Phys.* **110**, 054505 (2011).
102. A. Sugawara, Y. Wada, Y. Ishikawa and T. Toyabe, A Proposal of high performance and highly fabricable complementary organic thin film transistor structure, *Jpn. J. Appl. Phys.* **50**, 04DK11 (2011).
103. R.T. Papke, E. White, P. Reddy, G. Weigel, M. Kamekura, H. Minegishi, R. Usami and A. Ventosa, Multilocus sequence analysis (MLSA) approach to halobacteriales phylogeny and taxonomy, *Int. J. Syst. Evol. Micr.* **61**, 2984-2995 (2011).
104. Y. Shimane, y. Hatada, H. Minegishi, A. Echigo, S. Nagaoka, M. Miyazaki, Y. Ohta, T. Maruyama, R. Usami, W.D. Grant and K. Horikoshi, Salarchaeum japonicum gen. nov., sp nov., an aerobic, extremely halophilic member of the Archaea isolated from commercial salt, *Int. J. Syst. Evol. Microbiol.* **61**, 2266-2270 (2011).
105. M. Oshikawa, C. Tsutsui, T. Ikegami, Y. Fuchida, M. Matsubara, S. Toyama, R. Usami, K. Ohtoko and S. Kato, Full-length transcriptome analysis of human retina-derived cell lines ARPE-19 and Y79 using the vector-capping Method, *Invest. Ophthalmol. Vis. Sci.* **52**, 6662-6670 (2011).
106. S. Nagaoka, H. Minegishi, A. Echigo, Y. Shimane, M. Kamekura and R. Usami, Halostagnicola alkaliphila sp nov., an alkaliphilic haloarchaeon from commercial rock salt, *Int. J. Syst. Evol. Microbiol.* **61**, 1149-1152 (2011).
107. H. Shimoshige, H. Kobayashi and R. Usami, Inhibition of gene expression in Escherichia coli under hypergravity, *Biosci. Biotechnol. Biochem.* **75**, 175-177 (2011).
108. K. Kobayashi, H. Tateishi-Karimata, K. Tsutsui, Y. Wada and N. Sugimoto, DNA Morphologic Changes Induced by Spermine on a Gold Surface under DNA Crowding Conditions, *Chem. Lett.* **40**, 855-857 (2011).

109. S. Seki, H. Tamura, Y. Wada, K. Tsutsui and S. Ootomo, Depth profiling of micrometer-order area by mesa-structure fabrication, *Surf. Interface Anal.* **43**, 154-158 (2011).
110. E.M.A. Jamal, D.S. Kumar and M.R. Anantharaman, On structural, optical and dielectric properties of zinc aluminate nanoparticles, *Bull. Mat. Sci.* **34**, 251-259 (2011).
111. T.N., Narayanan, A.P.R. Mery, P.K.A. Swalih, D.S. Kumar, D. Makarov, M. Albrecht, J. Puthumana, A. Anas and M.R. Anantharaman, Enhanced bio-compatibility of ferrofluids of self-assembled superparamagnetic iron oxide-silica core-shell nanoparticles, *J. Nanosci. Nanotechnol.* **11**, 1958-1962 (2011).
112. A. Aki, B.G. Nair, H. Morimoto, D.S. Kumar and T. Maekawa, Label-free determination of the number of biomolecules attached to cells by measurement of the cell's electrophoretic mobility in a microchannel, *PLoS One* **5**, e15641 (2010).
113. B.G. Nair, Y. Nagaoka, H. Morimoto, Y. Yoshida, T. Maekawa and D.S. Kumar, Aptamer conjugated magnetic nanoparticles as nanosurgeons, *Nanotechnology* **21**, 455102 (2010).
114. R.L.D. Whitby, V.M. Gun'ko, T. Fukuda and T. Maekawa, Relating bulk resistivity to nanoscale mechanical responses of carbon nanotubes randomly orientated in monoliths under compression, *Carbon* **48**, 3635-3637 (2010).
115. R. Nair, S.H. Varghese, B.G. Nair, T. Maekawa, Y. Yoshida, and D.S. Kumar, Nanoparticulate material delivery to plants, *Plant Sci.* **179**, 154-163 (2010).
116. S.H. Varghese, R. Nair, B.G. Nair, T. Hanajiri, T. Maekawa, Y. Yoshida and D.S. Kumar, Sensors based on carbon nanotubes and their applications: A review, *Curr. Nanosci.* **6**, 331-346 (2010).
117. T. Hasumura, T. Fukuda, R.L.D. Whitby, O. Aschenbrenner and T. Maekawa, Low temperature synthesis of fibres composed of carbon-nickel nanoparticles in super-critical carbon dioxide, *Chem. Phys. Lett.* **492**, 304-308 (2010).
118. R.G. Aswathy, Y. Yoshida, T. Maekawa and D.S. Kumar, Near-infrared quantum dots for deep tissue imaging, *Anal. Bioanal. Chem.* **397**, 1417-1435 (2010).
119. T. Mizuki, N. Watanabe, Y. Nagaoka, T. Fukushima, H. Morimoto, R. Usami and T. Maekawa, Activity of an enzyme immobilized on superparamagnetic particles in a rotational magnetic field, *Biochem. Biophys. Res. Commun.* **393**, 779-782 (2010).
120. T. Nakajima, T. Toda, T. Hanajiri, T. Toyabe and T. Sugano, In-depth profiling of electron trap states in silicon-on-insulator layers and local mechanical stress near the silicon-on-insulator/buried oxide interface in separation-by-implanted-oxygen wafers, *J. Appl. Phys.* **108**, 124505 (2010).
121. R.L.D. Whitby, T. Fukuda, T. Maekawa, S.V. Mikhalovsky and A.B. Cundy, Real-time imaging of complex nanoscale mechanical responses of carbon nanotubes in highly compressible porous monoliths, *Nanotechnology* **21**, 075707 (2010).
122. D.S. Kumar, B.G. Nair, S.H. Varghese, R. Nair, T. Hanajiri, T. Maekawa, Y. Yoshida, R.K. John and A. Jayakrishnan, Blood compatibility of surface modified polyethylene terephthalate (PET) by plasma polymerized acetobromo--D-glucose, *J. Biomater. Appl.* **24**, 527-544 (2010).
123. M. Sagermann, A. Ohtaki, K. Newton and N. Doukyu, Structural characterization of the organic solvent-stable cholesterol oxidase from Chromobacterium sp DS-1, *J. Struct. Biol.* **170**, 32-40 (2010).
124. H. Ogino, S. Tsuchiyama, M. Yasuda and N. Doukyu, Enhancement of the aspartame precursor synthetic activity of an organic solvent-stable protease, *Protein Eng. Des. Sel.* **23**, 147-152 (2010).
125. N. Doukyu and H. Ogino, Organic solvent-tolerant enzymes, *Biochem. Eng. J.* **48**, 270-282 (2010).
126. Y. Ishikawa, Y. Wada and T. Toyabe, Origin of characteristics differences between top and bottom contact organic thin film transistors , *J. Appl. Phys.* **107**, 053709 (2010).
127. Y. Ishikawa, Y. Wada, K. Tsutsui and T. Toyabe, Current reduction mechanism in organic thin film transistors, *Jpn. J. Appl. Phys.***49**, 04DK01 (2010).
128. S. Nagaoka, H. Minegishi, A. Echigo and R. Usami, Halostagnicola kamekurae sp nov., an extremely halophilic archaeon from solar salt, *Int. J. Syst. Evol. Microbiol.* **60**, 2828-2831 (2010).
129. H. Shimoshige, H. Kobayashi, S. Shimamura and R.Usami, Gravity sensing by Escherichia coli, *Biosci. Biotechnol. Biochem.* **74**, 2511-2514 (2010).
130. H. Minegishi, A. Echigo, S. Nagaoka, M. Kamekura and R. Usami, Halarchaeum acidiphilum gen. nov., sp. nov., a moderately acidophilic haloarchaeon isolated from commercial solar salt, *Int. J. Syst. Evol. Microbiol.* **60**, 2513-2516 (2010).
131. Y. Shimane, Y. Hatada, H. Minegishi, T. Mizuki, A. Echigo, M. Miyazaki, Y. Ohta, R. Usami, W.D. Grant and K. Horikoshi, Natronoarchaeum mannanilyticum gen. nov., sp. nov., an aerobic, extremely halophilic archaeon isolated from commercial salt, *Int. J. Syst. Evol. Microbiol.* **60**, 2529-2534 (2010).
132. H. Minegishi, M. Kamekura, T. Itoh, A. Echigo, R. Usami and T. Hashimoto, Further refinement of the phylogeny of the Halobacteriaceae based on the full-length RNA polymerase subunit B ' (rpoB ') gene, *Int. J. Syst. Evol. Microbiol.* **60**, 2398-2408 (2010).
133. D.G. Burns, P.H. Janssen, T. Itoh, H. Minegishi, R. Usami, M. Kamekura and M.L. Dyall-Smith,

Natronomonas moolapensis sp nov., non-alkaliphilic isolates recovered from a solar saltern crystallizer pond, and emended description of the genus Natronomonas, *Int. J. Syst. Evol. Microbiol.* **60**, 1173-1176 (2010).

134. A. Echigo, H. Minegishi, T. Mizuki, M. Kamekura and R. Usami, Geomicrobium halophilum gen. nov., sp nov., a moderately halophilic and alkaliphilic bacterium isolated from soil, *Int. J. Syst. Evol. Microbiol.* **60**, 990-995 (2010).
135. T. Nakayama, T. Naganuma, N. Sato, Z.Y. Fu, N. Aoi, M. Soma, N. Doba, S. Hinohara and R. Usami, A haplotype-based case-control study of extracellular superoxide dismutase gene with cerebral infarction, *Endocr. J.* **57**, S564-S565 (2010).
136. T. Naganuma, T. Nakayama, N. Sato, Z.Y. Fu, M. Soma, M. Yamaguchi, M. Shimodaira, N. Aoi and R. Usami, Haplotype-based case-control study on human Apurinic/Apyrimidinic Endonuclease 1/Redox effector factor-1 gene and essential hypertension, *Am. J. Hypertens.* **23**, 186-191 (2010).
137. S. Toyama, M. Nakamura, R. Usami and S Kato, Development of a conductometric sensor to approximately estimate the plasma osmotic pressure of blood using a novel glass-bead-based blood cell filter, *Sens. Mater.* **22**, 211-221 (2010).
138. S. Ikeda, Y. Wada, and K. Saiki, Oriented growth of sexithiophene induced by edge of metal electrodes, *Jpn. J. Appl. Phys.* **49**, 04DK19 (2010).
139. V. Sunny, D.S. Kumar, P. Mohanan and M.R. Anantharaman, Nickel/carbon hybrid nanostructures as microwave absorbers, *Mater. Lett.* **64**, 1130-1132 (2010).
140. E.V. Gopalan, I.A. Al-Omari, D.S. Kumar, Y. Yoshida, P.A. Joy and M.R. Anantharaman, Inverse magnetocaloric effect in sol-gel derived nanosized cobalt ferrite, *Appl. Phys. A-Mater. Sci. Process.* **99**, 497-503 (2010).
141. E.V. Gopalan, K.A. Malini, G. Santhoshkumar, T.N. Narayanan, P.A. Joy, I.A. Al-Omari, D.S. Kumar, Y. Yoshida and M.R. Anantharaman, Template-assisted synthesis and characterization of passivated nickel nanoparticles, *Nanoscale Res. Lett.* **5**, 889-897 (2010).
142. V. Sunny, D.S. Kumar, Y. Yoshida, M. Makarewicz, W. Tabis and M.R. Anantharaman, Synthesis and properties of highly stable nickel/carbon core/shell nanostructures, *Carbon* **48**, 1643-1651 (2010).
143. H. Morimoto, T. Katano and T. Maekawa, Ring-chain structural transitions in a ferromagnetic particles system induced by a dc magnetic field, *J. Chem. Phys.* **131**, 034905 (2009).
144. N. Doukyu, K. Shibata, H. Ogino and M. Sagermann, Cloning, sequence analysis and expression of a gene encoding Chromobacterium sp. DS-1 cholesterol oxidase, *Appl. Microbiol. Biot.* **82**, 479-490. (2009).
145. N. Doukyu, Characteristics and biotechnological applications of microbial cholesterol oxidases. *Appl. Microbiol. Biot.* **83**, 825-837 (2009).
146. E.V. Gopalan, K.A. Malini, S. Sagar, D.S. Kumar, Y. Yoshida, I.A. Al-Omari and M.R. Anantharaman, Mechanism of ac conduction in nanostructured manganese zinc mixed ferrites, *J. Phys. D: Appl. Phys.* **42**, 165005 (2009).
147. E.V. Gopalan, K.A. Malini, D.S. Kumar, Y. Yoshida, I.A. Al-Omari, S. Saravanan and M.R. Anantharaman, On the dielectric dispersion and absorption in nanosized manganese zinc mixed ferrites, *J. Phys.: Condens. Mat.* **21**, 146006 (2009).
148. E.V. Gopalan, I.A. Al-Omari, K.A. Malini, P.A. Joy, D.S. Kumar, Y. Yoshida and M.R. Anantharaman, Impact of zinc substitution on the structural and magnetic properties of chemically derived nanosized manganese zinc mixed ferrites, *J. Magn. Magn. Mater.* **321**, 1092-1099 (2009).
149. H. Minegishi, M. Kamekura, T. Itoh, A. Echigo, R. Usami and T. Hashimoto, Further refinement of Halobacteriaceae phylogeny based on the full-length RNA polymerase subunit B' (rpoB') gene, *Int. J. Syst. Evol. Micr.* (2010), at press.
150. A. Yamamura, T. Ichimura, M. Kamekura, T. Mizuki, R. Usami, T. Makino, J. Ohtsuka, K. Miyazono, M. Okai, K. Nagata and M. Tanokura, Molecular Mechanism of Distinct Salt-Dependent Enzyme Activity of Two Halophilic Nucleoside Diphosphate Kinases, *Biophys. J.* **96**, 4692-4700 (2009).
151. T. Iida, Y. Moteki, K. Nakamura, K. Taguchi, M. Otagiri, M. Asanuma, N. Dohmae, R. Usami and T. Kudo, Functional expression of three rieske non-heme iron oxygenases derived from Actinomycetes in Rhodococcus species for investigation of their degradation capabilities of dibenzofuran and chlorinated dioxins, *Biosci. Biotech. Bioch.* **73**, 822-827 (2009).
152. A. Aki, O. Ito, H. Morimoto, Y. Nagaoka, Y. Nakajima, T. Mizuki, T. Hanajiri, R. Usami and T. Maekawa, Capture of nonmagnetic particles and living cells using a microelectromagnetic system, *J. Appl. Phys.* **104**, 094509 (2008).
153. H. Morimoto, T. Ukai, Y. Nagaoka and T. Maekawa, Tumbling motion of magnetic particles on a magnetic substrate induced by a rotational magnetic field, *Phys. Rev. E* **78**, 021403 (2008).
154. N.J.K. Rantonen, T. Toyabe and T. Maekawa, Catalyst-free growth of needle-shaped carbon filaments at low temperature in a near-critical binary fluid, *Carbon* **46**, 1223-1229 (2008).
155. R.L.D. Whitby, T. Fukuda, T. Maekawa, S.L. James and S.V. Mikhalovsky, Geometric control and tuneable

pore size distribution of buckypaper and buckydiscs, *Carbon* **46**, 949-956 (2008).

156. A. Aki, Y. Nihei, H. Asai, T. Ukai, H. Morimoto, Y. Nakajima, T. Hanajiri and T. Maekawa, Detection of surface immunoreactions on individual cells by electrophoretic mobility measurement in a micro-channel, *Sensor. Actuat. B: Chem.* **131**, 285-289 (2008).
157. H. Minegishi, T. Mizuki, A. Echigo, T. Fukushima, M. Kamekura and R. Usami, Acidophilic haloarchaeal strains are isolated from various solar salts, *Saline Systems* **16**, 1-4 (2008).
158. T. Nagaura, T. Nakayama, N. Sato, T. Takahashi, Z. Fu, M. Soma, N. Aoi and R. Usami, A Haplotype-based case-control study examining human extracellular superoxide dismutase gene and essential hypertension, *Hypertens. Res.* **31**, 1533-1540 (2008).
159. T. Motoyama, N. Ochiai, M. Morita, Y. Iida, R. Usami and T. Kudo, Involvement of putative response regulator genes of the rice blast fungus Magnaporthe oryzae in osmotic stress response, fungicide action, and pathogenicity, *Curr. Genet.* **54**, 185-195 (2008).
160. Y. Serizawa, J. Tie, H. Tsutsumi, S. Oshida, Y. Yoshida and R. Usami, Detection of mitochondrial DNA polymorphisms from human hair shafts and formalin fixed tissue using whole genome amplification, *Int. Med. J.* **15**, 163-167 (2008).
161. M. Oshikawa, Y. Sugai, R. Usami, K. Ohtoko, S. Toyama and S. Kato, Fine expression profiling of full-length transcripts using a size-unbiased cDNA library prepared with the vector-capping method, *DNA Res.* **15**, 123-136 (2008).
162. M.A. Allen, F. Goh, S. Leuko, A. Echigo, T. Mizuki, R. Usami, M. Kamekura, B.A. Neilan and B.P. Burns, *Haloferax elongans* sp. nov. and *Haloferax mucosum* sp. nov., isolated from microbial mats from Hamelin Pool, Shark Bay, Australia, *Int. J. Syst. Evol. Micr.* **58**, 798-802 (2008).
163. Y. Nakajima, K. Sasaki, T. Hanajiri, T. Toyabe, and T. Sugano, Drive current enhancement in silicon on quartz MOSFETs, *IEEE Electron Device Lett.* **29**, 944-945 (2008).
164. N. Urushihara, S. Iida, N. Sanada, M. Suzuki, D.F. Paul, S. Bryan, Y. Nakajima, T. Hanajiri, K. Kakushima, P. Ahmet, K. Tsutsui, and H. Iwai, Three dimensional image construction and spectrum extraction from two dimensional elemental mapping in Auger electron spectroscopy, *J. Vac. Sci. Technol. A* **26**, 668-672 (2008).
165. K. Kajiwara, Y. Nakajima, T. Hanajiri, T. Toyabe and T. Sugano, Characterization of distribution of trap states in silicon-on-insulator layers by front-gate characteristics in n-channel SOI MOSFETs, *IEEE Trans. Electron Devices* **55**, 1702-1707 (2008).
166. S. Nishiyama, M. Tajima, Y. Nakajima, T. Hanajiri and Y. Yoshida, Ultraviolet irradiation effects on and depth profiles in X-ray photoelectron spectra of poly (vinylpyridine) thin films, *Jpn. J. Appl. Phys.* **47**, 432-437 (2008).
167. S. Ikeda, K. Saiki, Y. Wada, K. Inaba, Y. Ito, H. Kikuchi, K. Terashima and T. Shimada, Graphoepitaxy of sexithiophene and orientation control by surfacetreatment, *J. Appl. Phys.* **103**, 084313 (2008).
168. D. Saida, K. Tsutsui, Y. Wada and T. Takahashi, Quantitative Current Evaluation Through Magnetic Field Detection by Magnetic Force Microscopy, *IEEE T. Magn.* **44**, 1779 (2008).
169. S. Seki, H. Tamura, Y. Wada, K. Tsutsui and S. Ootomo , Micro-area analysis in SIMS depth profiling by mesa-structure preparation, *Appl. Surf. Sci.* **255**, 1373-1376 (2008).
170. N. Doukyu, W. Yamagishi, H. Kuwahara and H. Ogino. A Maltooligosaccharide-Forming Amylase Gene from Brachybacterium sp. Strain LB25: Cloning and Expression in *Escherichia coli*., *Biosci. Biotech. Bioch.* **72**, 2444-2447 (2008).
171. N. Doukyu, K. Shibata, H. Ogino and M. Sagermann. Purification and characterization of *Chromobacterium* sp. DS-1 cholesterol oxidase with thermal, organic solvent, and detergent tolerance. *Appl. Microbiol. Biot.* **80**, 59-70 (2008).
172. H. Ogino, S. Inoue, R. Akagi, M. Yasuda, N. Doukyu and K. Ishimi. Refolding of a recombinant organic solvent-stable lipase, which is overexpressed and forms an inclusion body, and activation with lipase-specific foldase. *Biochem. Eng. J.* **40**, 507-511 (2008).
173. H. Ogino, H. Nakayama, H. China, T. Kawata, N. Doukyu and M. Yasuda. Characterization of Recombinant Glyoxylate Reductase from Thermophile *Thermus thermophilus* HB27, *Biotechnol Prog.* **24**, 321-325 (2008).
174. A. Tonomura and F. Nori, Quantum physics – Disturbance without the force, *Nature* **452**, 298-299 (2008).
175. T.N. NAarayanan, D.S. Kumar, Y. Yoshida and M.R. Anantharaman, Strain induced anomalous red shift in mesoscopic iron oxide prepared by a novel technique, *B. Mater. Sci.* **31**, 759-766 (2008).
176. E.V. Gopalan, K.A. Malini, S. Saravanan, D.S. Kumar, Y. Yoshida and M.R. Anantharaman, Evidence for polaron codduction in nanostructured manganese ferrite, *J. Phys. D: Appl. Phys.* **41** , 185005 (2008).
177. S. Thomas, S.H. Al-Harthi, D.S. Kumar, I.A. Al-Omari, R.V. Ramanujan, Y. Yoshida and M.R. Anantharaman, Microstructure and random magnetic anisotropy in Fe–Ni based nanocrystalline thin films, *J. Phys. D: Appl. Phys.* **41**, 155009 (2008).
178. S. Thomas, D.S. Kumar, Y. Yoshida and M.R. Anantharaman, Spectroscopic and photoluminescence studies on optically transparent magnetic nanocomposites based on sol-gel glass: Fe_3O_4, *J. Nanopart. Res.*

10, 203-206 (2008).

179. M. Masuda, Y. Yamasaki, S. Ueno and A. Inoue, Isolation of bisphenol A-tolerant/degrading Pseudomonas monteilii strain N-502*, Extremophiles* **11**, 355-362 (2007).
180. T. Fukuda, N. Watabe, R. Whitby and T. Maekawa, Creation of carbon onions and coils at low temperature in near-critical benzene irradiated with an ultraviolet laser, *Nanotechnology* **18**, 415604 (2007).
181. T. Fukuda, T. Maekawa, T. Hasumura, N. Rantonen, K. Ishii, Y. Nakajima, T. Hanajiri, Y. Yoshida, R. Whitby and S. Mikhalovsky, Dissociation of carbon dioxide and creation of carbon particles and films at room temperature, *New J. Phys.* **9**, 321 (2007).
182. T. Fukuda, K. Ishii, S. Kurosu, R. Whitby and T. Maekawa, Formation of clusters composed of C_{60} molecules via self-assembly in critical fluids, *Nanotechnology* **18**, 145611 (2007).
183. Y. Yoshikawa, T. Nakayama, K. Saito, P. Hui, A. Morita, N. Sato, T. Takahashi, M. Tamurai, I. Sato, N. Aoi, N. Doba, S. Hiniohara, M. Soma and R. Usami, Haplotype-based case-control study of the association between the guanylate cyclase activator 2B (GUCA2B, uroguanylin) gene and essential hypertension, *Hypertens. Res.* **30**, 789-796 (2007).
184. M. Enache, T. Itoh, T. Fukushima, R. Usami, L. Dumitru and M. Kamekura, Phylogenetic relationships within the family Halobacteriaceae inferred from rpoB' gene and protein sequences, *Int. J. Syst. Evol. Micr.* **57**, 2289-2295 (2007).
185. Y. Ando, M. Ohmori, H. Ohtake, K. Ohtoku, S. Toyama, R. Usami, A. O'hara, H. Hata, K. Yanashima and S. Kato, Mutation screening and haplotype analysis of the rhodopsin gene locus in Japanese patients with retinitis pigmentosa, *Mol. Vis.* **13**, 1038-1044 (2007).
186. N. Takahashi-Ando, M. Inaba, S. Ohsato, T. Igawa, R. Usami and M. Kimura, Identification of multiple highly similar XIP-type xylanase inhibitor genes in hexaploid wheat, *Biochem. Bioph. Res. Co.* **360**, 880-884 (2007).
187. S. Deguchi, T. Yamazaki, S. Mukai, R. Usami and K. Horikoshi, Stabilization of C-60 nanoparticles by protein adsorption and its implications for toxicity studies, *Chem. Res. Toxicol.* **20**, 854-858 (2007).
188. A. Echigo, T. Fukushima, T. Mizuki, M. Kamekura and R. Usami, *Halalkalibacillus halophilus* gen. nov., sp. nov., a new moderately halophilic and alkaliphilic bacterium isolated from a non-saline soil sample in Japan, *Int. J. Syst. Evol. Micr.* **57**, 1081-1085 (2007).
189. R. Usami, A. Echigo, T. Fukushima, T. Mizuki, Y. Yoshida and M. Kamekura, *Alkalibacillus silvisoli* sp. nov., an alkaliphilic moderate halophile isolated from non-saline forest soil in Japan, *Int. J. Syst. Evol. Micr.* **57**, 770-774 (2007).
190. T. Matuura, T. Terayama, R. Usami, H. Yoshida, H. Hara and K. Matsumoto, Involvement of YkoN in production of a new phospholipids in *Bacillus subtilis* Marburg, *J. Jpn. Soc. Extremophiles* **6**, 36-42 (2007).
191. T. Matsuura, R. Usami, H. Yoshida, H. Hara and K. Matsumoto, Characterization of novel esterase YkoN from *Bacillus subtilis* Marburg, *J. Jpn. Soc. Extremophiles* **6**, 30-35 (2007).
192. T. Fukushima, R. Usami and M. Kamekura, A traditional Japanese-style salt field is a niche for haloarchaeal strains that can survive in 0.5% salt solution, *Saline Systems* **3**, 1-12 (2007).
193. Y. Azuma, H. Kato, R. Usami and T. Fukushima, Bacterial sterization using cavitating jet, *J. Fluid Sci. Technol.* **2**, 270-281 (2007).
194. H. Ogino, Y. Katou, R. Akagi, T. Mimitsuka, S. Hiroshima, Y. Gemba, N. Doukyu, M. Yasuda, K. Ishimi and H. Ishikawa. Cloning and expression of gene, and activation of an organic solvent-stable lipase from *Pseudomonas aeruginosa* LST-03. *Extremophiles* **11**, 809-817 (2007).
195. N. Doukyu, W. Yamagishi, H. Kuwahara, H. Ogino and N. Furuki. Purification and characterization of a maltooligosaccharide-forming amylase that improves product selectivity in water-miscible organic solvents, from dimethylsulfoxide-tolerant *Brachybacterium* sp. strain LB25, *Extremophiles* **11**, 781-788 (2007).
196. H. Ogino, T. Uchiho, N. Doukyu, M. Yasuda, K. Ishimi and H. Ishikawa. Effect of exchange of amino acid residues of the surface region of the PST-01 protease on its organic solvent-stability. *Biochem. Bioph. Res. Co.* **358,** 1028-1033 (2007).
197. S. Tsuchiyama, N. Doukyu, M. Yasuda, K. Ishimi and H. Ogino, Peptide Synthesis of Aspartame Precursor Using Organic-Solvent-Stable PST-01 Protease in Monophasic Aqueous-Organic Solvent Systems. *Biotechnol. Prog.* **23,** 820-823 (2007).
198. H. Ogino, Y. Gemba, Y. Yutori, N. Doukyu, K. Ishimi and H. Ishikawa. Stabilities and conformational transitions of various proteases in the presence of an organic solvent. *Biotechnol. Prog.* **23**, 155-161 (2007).
199. K. Tsutsui, M. Nakata, M. Morita, M. Tokuda, K. Nagatsuma, H. Onozato, T. Kaneko, T. Edura, Y. Mita, H. Koinuma and Y Wada, Novel Fabrication Technologies of Planar Nano-gap Electrodes for Single Molecule Evaluation, *Curr. Appl. Phys.* **7**, 329 (2007).
200. Y. Ito, K. Inaba, K. Omote, Y. Wada, and S. Ikeda, Characterization of Submicron-scale Periodic Grooves by Grazing Incidence Ultra-small- angle X-ray Scattering, *Jpn. J. Appl. Phys.* **46**, L773-L775 (2007).
201. A. Tonomura, Dynamic observation of vortices in Nb and Bi-2212 thin films using Lorentz microscopy,

Physica A **560**, 285-288 (2007).

202. A. Shoji, K. Nakamura, S. Nishiyama, D.S. Kumar, K. Murata, Y. Nakagawa, H. Noguchi, K. Kashiwagi, Y. Yoshida and S. Ishii, Characterization and properties of the plasma polymer films prepared from carbon dioxide and 1,3-butadiene, *J. Photopolym. Sci. Tec.* **20**, 817-822 (2007).
203. A. Shoji, K. Nakamura, S. Nishiyama, D.S. Kumar, K. Murata, Y. Nakagawa, H. Noguchi, K. Kashiwagi, Y. Yoshida and S. Ishii, Characterization and properties of the plasma polymer films prepared from carbon dioxide and 1,3-butadiene, *J. Photopolym. Sci. Tec.* **20**, 817-822 (2007).
204. K.V. George, T. David, R.P. Thomas, A.S. Vargjese, D.S. Kumar and Y. Yoshida, Efficiency of the bioactive compounds allium sativum linn on in vitro crystallization of cholesterol, *Ind. J. Multidisci. Res.* **3**, 315-320 (2007).
205. D.S. Kumar, M. Fujioka, K. Asano, A. Shoji, A. Jayakrishnan and Y. Yoshida, Surface modification of poly(ethylene terephthalate) by plasma polymerization of poly(ethylene glycol), *J. Mater. Sci.: Mater. M.* **18**, 1831-1835 (2007).
206. A. Shoji, N. Tsukada, D.S. Kumar, K. Kashiwagi and Y. Yoshida, Plasma polymerization of manganese chloride tetraphenylporphyrin and evaluation of the thin film, *J. Photopolym. Sci. Tec.* **20**, 241-244 (2007).
207. S. Aikawa, Y. Yoshida, S. Hatae, S. Nishityama and D.S. Kumar, Synthesis and characterization of a fullerene derivatives, *Mol. Cryst. Liq. Cryst.* **463**, 519-526 (2007).

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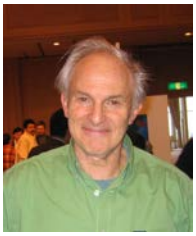
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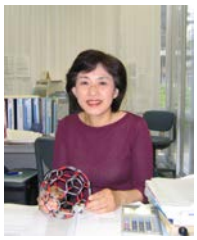
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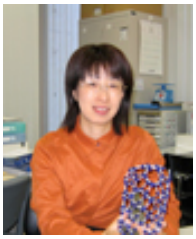
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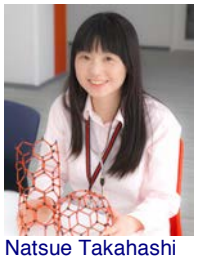
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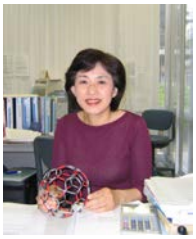
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