Akira BABA, Ph.D.

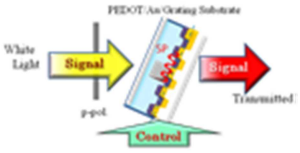
Associate Professor
Program: Electrical and Information Engineering
Area: Electrical and Electronic Engineering
Undergraduate: Dept. of Electrical and Electronic Eng.

Professional Expertise

Organic Electronics: Plasmon enhanced organic solar cells, Conducting polymer ultrathin films
Bio-photonics: Conducting polymer based biosensors, Plasmonic/Microfluidic devices
Plasmonics: Plasmonic organic devices, Characterization of molecular films by surface plasmon spectroscopy, Electrochemical-surface plasmon techniques
Nanofabrication: Layer-by-layer ultrathin films, AFM nanolithography

Research Fields of Interest

His research interest is the investigation of surface/interfacial phenomena at the nano and molecular level using novel surface-sensitive techniques and its applications to bio-sensor and bio-nanoelectronic devices. The research focus involves developments of surface sensitive techniques, nanofabrication of organic thin films, and biological opto-electronic applications.



EC-TSPR

Education

1999: Ph.D. in Engineering, Niigata University,
1997: M. Eng. Department of Electrical and Electronic Engineering, Niigata University
1995: B. Eng. Department of Electrical and Electronic Engineering, Niigata University

Professional and Research Experiences

2007-current: Associate Professor, Niigata University
2007-current: Visiting Researcher, National Institute of Advanced Industrial Science and Technology, Photonics Research Institute, Japan
2004- 2006: Research Associate: University of Houston, Department of Chemistry, USA
2003: Research Fellow, National University of Singapore, Department of Materials Science,
1999-2002: Postdoctoral Research Fellow/Alexander von Humboldt Research Fellow, Max-Planck-Institute for Polymer Research, Germany
1998: Research Assistant: University of Alabama at Birmingham, Department of Chemistry, USA

Professional Societies and Activities

1. The Japan Society of Applied Physics
2. The Institute of Electrical Engineers of Japan
3. The Institute of Electronics, Information and Communication Engineers

Awards

1. Award for Encouragement of Research in Thin Films (The 15th International Conference of Thin Films), 2011

2. NIH-related Keck Center Nanobiology Fellowship, 2006
3. Alexander von Humboldt Research Fellowship, 1999
4. The 4th Japanese Society of Applied Physics Awards for Research Paper Presentation, 1998

Major Publications

Papers

[1] Chutiparn Lertvachirapaiboon, Akira Baba, Sanong Ekgasit, Chuchaat Thammacharoen, Kazunari Shinbo, Keizo Kato, Futao Kaneko "Distance-Dependent Surface Plasmon Resonance Coupling between a Gold Grating Surface and Silver Nanoparticles" Plasmonics, (2014), accepted

[2] S. Chuekachang, R. Janmanee, A. Baba, S. Phanichphant, S. Sriwichai, K. Shinbo, K. Kato, F. Kaneko, N. Fukuda, H. Ushijima "Electrochemically Controlled Detection of Adrenaline on Poly(2-aminobenzylamine) Thin Films by Surface Plasmon Resonance Spectroscopy and Quartz Crystal Microbalance" Surface and Interface Analysis, Vol. 45, pp.1661-1666 (2013)

[3] Chutiparn Lertvachirapaiboon, Chirayut Supunyabut, Akira Baba, Sanong Ekgasit, Chuchaat Thammacharoen, Kazunari Shinbo, Keizo Kato, Futao Kaneko "Transmission Surface Plasmon Resonance Signal Enhancement via Growth of Gold Nanoparticles on a Gold Grating Surface " Plasmonics, Vol. 8, pp.369-375 (2013).

[4] Hathaithip Ninsonti, Weerasak Chomkitichai, Akira Baba, Wiyong Kangwansupamonkon, Sukon Phanichphant, Kazunari Shinbo, Keizo Kato, Futao Kaneko "Enhanced Photocurrent Properties of Dye/Au-loaded TiO_2 Films by Grating-coupled Surface Plasmon Excitation" IEICE Transactions Electronics, Vol. E96-C, pp.385-388 (2013)

[5] Akira Baba, Kohji Tada, Rapiphun Janmanee, Saengrawee Sriwichai, Kazunari Shinbo, Keizo Kato, Futao Kaneko, Sukon Phanichphant "Controlling Surface Plasmon Optical Transmission with Electrochemical Switch Using Conducting Polymer Thin Films" Advanced Functional Materials, Vol. 22, pp.4383-4388 (2012)

[6] Chutiparn Lertvachirapaiboon, Ryosuke Yamazaki, Prompong Pienpinijtham, Akira Baba, Sanong Ekgasit, Chuchaat Thammacharoen, Kazunari Shinbo, Keizo Kato, Futao Kaneko "Solution-based fabrication of gold grating film for use as a surface plasmon resonance sensor chip" Sensors and Actuators B: Chemical,Vol. 173, pp.316-321 (2012)

[7] Rapiphun Janmanee, Akira Baba, Sukon Phanichphant, Saengrawee Sriwichai, Kazunari Shinbo, Keizo Kato, Futao Kaneko "In situ Electrochemical-Transmission Surface Plasmon Resonance Spectroscopy for Poly(pyrrole-3-carboxylic acid) Thin-Film-Based Biosensor Applications" ACS Appl. Mater. Interfaces, Vol. 4, pp.4270-4275 (2012).

[8] Guoqian Jiang, Chengyu Huang, Akira Baba, Rigoberto Advincula "Monitoring in situ Electrochemical Crosslinking in Nanostructured Precursor Polymer Films by EC-SPR Spectroscopy" Macromolecular Reaction Engineering Vol. 6, pp.153–159 (2012)

[9] Akira Baba, Keisuke Wakatsuki, Kazunari Shinbo, Keizo Kato, Futao Kaneko "Increased Short-Circuit Current in Grating-Coupled Surface Plasmon Resonance Field-Enhanced Dye-Sensitized Solar Cell" Journal of Materials Chemistry, Vol. 21, pp.16436-16441 (2011)

[10] Akira Baba, Nobutaka Aoki, Kazunari Shinbo, Keizo Kato, Futao Kaneko "Grating-Coupled Surface Plasmon Enhanced Short-Circuit Current in Organic Thin-Film Photovoltaic Cells" ACS Applied Materials & Interfaces, Vol.3, pp2080-2084, 2011

[11] Gareth Sheppard, Takao Oseki, Akira Baba, Derek Patton, Futao Kaneko, Leidong Mao, Jason Locklin "Thiolene-Based Microfluidic Flow Cells for Surface Plasmon Resonance Imaging" Biomicrofluidics, Vol. 5, p.026501 (2011).

[12] Akira Baba, Takumi Nakatsukasa, Akihisa Baba, Kazunari Shinbo, Keizo Kato, Futao Kaneko "Fabrication of Fluorescence Tunable Electrospun Conjugated Polycarbazole Fibers Containing Gold Nanoparticles" Journal of Nanoscience and Nanotechnology, Vol. 11, pp4289-4294 (2011)

[13] Janmanee Rapiphun, Akira Baba, Sukon Phanichphant, Saengrawee Sriwichai, Kazunari Shinbo, Keizo Kato, Futao Kaneko "Detection of Human IgG on Poly(pyrrole-3-carboxylic acid) Thin Film by Electrochemical-Surface Plasmon Resonance Spectroscopy" Japanese Journal of Applied Physics, Vol. 50, 01BK02 (6 pages), (2011).

[14] Akira Baba, Chuanjun Xia, Wolfgang Knoll, Rigoberto C Advincula "Electrochemical Surface Plasmon Resonance and Field Enhanced Light Scattering (EC-SPR/EC-SPFELS): Monomer Copolymerization with a Polysiloxane Conjugated Polythiophene Network Precursor" Macromolecular Chemistry and Physics, Vol. 211, pp2624-2635, 2010

[15] Akira Baba*, Touru Mannen, Yasuo Ohdaira, Kazunari Shinbo, Keizo Kato, Futao Kaneko, Nobuko Fukuda, and Hirobumi Ushijima "Detection of Adrenaline on Poly(3-aminobenzylamine) Ultrathin Film by Electrochemical-Surface Plasmon Resonance Spectroscopy" Langmuir, Vol. 26, pp18476–18482, 2010

[16] Akira Baba, Taihei Matsuzawa, Saengrawee Sriwichai, Yasuo Ohdaira, Kazunari Shinbo, Keizo Kato, Sukon Phanichphant, Futao Kaneko "Enhanced Photocurrent Generation in Nanostructured Chromophore/Carbon Nanotube Hybrid Layer-by-Layer Multilayers" The Journal of Physical Chemistry C, Vol. 114, pp 14716–14721, 2010

[17] Akira Baba, Ramakrishna Ponnapati, Prasad Taranekar, Wolfgang Knoll, Rigoberto Advincula "Electrochemical Surface Plasmon Resonance (EC-SPR) and Waveguide Enhanced Glucose Biosensing with N-Alkylaminated Polypyrrole/Glucose Oxidase Multilayers" ACS Applied Materials & Interfaces, Vol. 2, pp 2347–2354, 2010

Book Chapters

[1] Akira Baba, Rigoberto Advincula: "Handbook of Spectroscopy" eds. by Gauglitz, Moore and Vo-Dinh, Wiley-VCH Verlag GmbH : Chapter 9-1 "Surface Plasmon Spectroscopy Methods and Electrochemical Analysis" pp.1161-1178, (2014)

[2] A. Baba, F. Kaneko, R. Advincula, W. Knoll: "Functional Polymer Films" eds. by Knoll & Advincula, Wiley-VCH (2011) Chapter 22 "Electrochemical Surface Plasmon Techniques for Polymer Thin Films" pp.723-744

[3] Akira Baba, Kazunari Shinbo, Keizo Kato, Futao Kaneko, Hirobumi Ushijima, Kiyoshi Yase: "Carbon Nanotubes - from Research to Applications", Ed. by S. Bianco, Intech, (2011)、Chapter 7 "Assembly and Patterning of Single-Walled Carbon Nanotubes/Organic Semiconductors " pp.111-124