Takashi Ito

Curriculum Vitae

Department of Chemistry
Kansas State University
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Manhattan, Kansas 66506

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Education

1995-1998	Ph.D. Chemistry, Department of Chemistry, School of Science, The University of Tokyo Mentor: Prof. Yoshio Umezawa
1993-1995	M. S. Chemistry, Department of Chemistry, School of Science, The University of Tokyo Mentor: Prof. Yoshio Umezawa
1989-1993	B. S. Chemistry, Department of Chemistry, School of Science, The University of Tokyo Mentor: Prof. Yoshio Umezawa

Research and professional experience

2004-present	Assistant Professor Department of Chemistry, Kansas State University
2001-2004	Postdoctoral research associate Department of Chemistry, Texas A&M University Mentor: Prof. Richard M. Crooks
1998-2001	Research Associate Department of Chemistry, Tokyo University of Science Mentor: Prof. Yuko Hasegawa

Honors and Awards

- The Japan Society for Analytical Chemistry Award for Young Researchers (September, 2003)
- Koensho Award (best presentation) in *60th Spring Meeting of the Japan Society for Analytical Chemistry* (Hirosaki, Japan, May 1999)
- Research fellow of the Japan Society for the Promotion of Science (JSPS) (1995–1998)

Professional Activities and Affiliations:

Member,	The Japan Society for Analytical Chemistry, American Chemical Society, Chemical Society of Japan, The Electrochemical Society, Alpha Chi Sigma
Peer Reviewer,	*Nature Materials*, *J. Am. Chem. Soc.*, *Anal. Chem.*, *Langmuir*, *Chem. Mater.*, *Macromolecules*, *Appl. Phys. Lett.*, *J. Appl. Phys.*, *Anal. Chim. Acta*, *Electroanalysis*, *J. Colloid Interface Sci.*, *Colloids Surf. B*, *Anal. Sci.*, *IEEE Sensors Journal*, *J. Phys. Chem. Solids*
Peer Reviewer,	*Technology Foundation STW (Dutch)*, *ACS-PRF (Type G)*, *DOD-ARO*, *NASA Postdoctoral Program, U.S. Civilian Research and Development Foundation*

Publications

Original Papers, Accounts (Peer-Reviewed Publications)

39. H. C. Maire, Y. Li, S. Ibrahim, T. Ito "Roughness-Induced Vertical Alignment of Cylindrical Domains in Thin Films of a Polystyrene–Poly(methylmethacrylate) Diblock Copolymer Studied Using Atomic Force Microscopy and Cyclic Voltammetry" *Macromolecules*, submitted (May 2008).
38. Y. Li, T. Ito "Surface Chemical Functionalization of Cylindrical Nanopores Derived from a Polystyrene-Poly(methylmethacrylate) Diblock Copolymer via Amidation" *Langmuir* **2008**, in press.
37. Y. Xiao, T. Ito, D. A. Higgins "Grayscale Patterning of Polymer Thin Films with Nanometer Precision by Direct-Write Multiphoton Photolithography" *Langmuir* **2008**, in press.
36. T. Ito, S. M. Forman, C. Cao, F. Li, C. R. Eddy, Jr., M. A. Mastro, R. T. Holm, R. L. Henry, K. L. Hohn, J. H. Edgar "Self-Assembled Monolayers of Alkylphosphonic Acid on GaN Substrates" *Langmuir* **2008**, in press.
35. T. Ito, D.-M. N. T. Perera, S. Nagasaka "Gold Electrodes Modified with Self-Assembled Monolayers for Measuring L-Ascorbic Acid: An Undergraduate Analytical Chemistry Laboratory Experiment", *J. Chem. Educ.* **2008**, in press.
34. T. Ito "Observation of DNA Molecules Using Fluorescence Microscopy and Atomic Force Microscopy: An Undergraduate Instrumental Analysis Laboratory Experiment" *J. Chem. Educ.* **2008**, *85*, 680-682.
33. Y. Li, H. C. Maire, T. Ito "Electrochemical Characterization of Nanoporous Films Fabricated from a Polystyrene–Poly(methylmethacrylate) Diblock Copolymer: Monitoring the Removal of the PMMA Domains and Exploring the Functional Groups on the Nanopore Surface", *Langmuir* **2007**, *23*, 12771-12776.
32. S. Ibrahim, D. A. Higgins, T. Ito "Direct-Write Multiphoton Photolithography: A Systematic Study of the Etching Behaviors in Various Commercial Polymers", *Langmuir* **2007**, *23*, 12406-12412. [Featured: H. Hogan "Choosing the Right Aids Direct-Write Multiphoton Photolithography" Photonic Spectra (Technology News), **2008** (January), 24-26.]
31. A. Xie, T. Ito and D. A. Higgins "Fabrication and Characterization of Polymer/Liquid-Crystal Composite Diffractive Optics by Multiphoton Methods" *Adv. Funct. Mater.* **2007**, *17*, 1515-1522.
30. T. Ito, A. A. Audi, G. P. Dible "Electrochemical Characterization of Recessed Nanodisk-Array Electrodes Prepared from Track-Etched Membranes" *Anal. Chem.* **2006**, *78*, 7048-7053.
29. D. A. Higgins, T. A. Everett, A. Xie, S. M. Forman, T. Ito "High-Resolution Direct-Write Multiphoton Photolithography in Poly(methylmethacrylate) Films" *Appl. Phys. Lett.* **2006**, *88*, 184101. [Selected for the June 2006 issue of *Virtual Journal of Ultrafast Science*.]
28. T. Nishino, T. Ito, Y. Umezawa "A Fullerene Molecular Tip Can Detect Localized and Rectified Electron Tunneling within a Single Fullerene-Porphyrin Pair", *Proc. Natl. Acad. Sci. USA* **2005**, *102*, 5659-5662.
27. T. Ito, L. Sun, R. R. Henriquez, R. M. Crooks "A Carbon Nanotube-Based Coulter Nanoparticle Counter", *Acc. Chem. Res.* **2004**, *37*, 937-945. [Correction: *Acc. Chem. Res.* **2005**, *38*, 687.]
26. T. Ito, L. Sun, M. A. Bevan, R. M. Crooks "Comparison of Nanoparticle Size and Electrophoretic Mobility Measurements using a Carbon Nanotube-Based Coulter Counter, Dynamic Light Scattering, Transmission Electron Microscopy, and Phase Analysis Light Scattering", *Langmuir* **2004**, *20*, 6940-6945.
25. T. Ito "Development of New Analytical Methodologies Based on Molecule/Particle Recognitions at Surfaces, Interfaces, and Carbon Nanotube Channels" (Japanese account) *Bunseki Kagaku* **2004**, *53*, 657-676.
24. R. R. Henriquez, T. Ito, L. Sun, R. M. Crooks "The Resurgence of Coulter Counting as a Nanoscale Analytical Method" *Analyst* **2004**, *129*, 478-482.
23. J. Dai, T. Ito, L. Sun, R. M. Crooks "Electrokinetic Trapping and Concentration Enrichment of DNA in a Microfluidic Channel" *J. Am. Chem. Soc.* **2003**, *125*, 13026-13027.

22. Y. Umezawa, T. Ito ”Chemically Modified Scanning Tunneling Microscopy Tips for Molecular Imaging” (Account) *Electrochemistry* **2003**, *71*, 522-529.
21. T. Nishino, T. Ito, Y. Umezawa “Selective Observation of Hydroxy and Carboxylate Moieties by Scanning Tunneling Microscopy Using Chemically Modified Tips with Differing Extent of Hydrogen Bond Acidity or Basicity” *J. Electroanal. Chem.* **2003**, *150-151*, 125-129.
20. T. Ito, L. Sun, R. M. Crooks “Observation of DNA Transport through a Single Carbon Nanotube Channel Using Fluorescence Microscopy” *Chem. Commun.* **2003**, 1482-1483.
19. T. Ito, L. Sun, R. M. Crooks “Simultaneous Determination of Size and Surface Charge of Individual Nanoparticles Using a Carbon Nanotube Coulter Counter” *Anal. Chem.* **2003**, *75*, 2399-2406.
18. T. Ito, L. Sun, R. M. Crooks “Electrochemical Etching of Individual Multiwall Carbon Nanotubes” *Electrochemical Solid-State Lett.* **2003**, *6*, C4-C7.
17. T. Nishino, T. Ito, Y. Umezawa “Carbon Nanotube STM Tips for Chemically Selective Imaging” *Anal. Chem.* **2002**, *74*, 4275-4278.
16. T. Ito, C. Goto "Ion-Selective Solvent Polymeric Membrane Electrodes Based on 1-Phenyl-3-Methyl-4-Acyl-5-Pyrazolones for Trivalent Lanthanoid Ions" *J. Trace and Microprobe Techniques* **2001**, *19,* 601-613.
15. T. Ito, C. Goto, K. Noguchi “Lanthanoid Ion-Selective Solvent Polymeric Membrane Electrode Based on 1-Phenyl-3-Methyl-4-Octadecanoyl-5-Pyrazolone” *Anal. Chim. Acta* **2001**, *443*, 41-51. (Erratum: *Anal. Chim. Acta* **2002**, *456*, 326.)
14. T. Nishino, P. Bühlmann, T. Ito, Y. Umezawa “Scanning Tunneling Microscopy Using Chemically Modified Tips: Orientation Selective Observation of Ether Oxygens” *Surf. Sci.* **2001**, *490*, L579-L584.
13. T. Ito, Y. Hasegawa "Some Considerations on Synergistic Extraction Behavior of Rare Earths(III) with Pivaloyltrifluoroacetone and Neutral Bidentate Ligands” *Solvent Extr. Res. Dev. Jpn.* **2001**, *8*, 47-62.
12. T. Ito “Uphill transport of lanthanoid (III) ions through supported liquid membranes based on *ß*-diketone and Lewis bases” (Japanese) *Bunseki Kagaku* **2001**, *50*, 301-308.
11. T. Nishino, P. Bühlmann, T. Ito, Y. Umezawa “Discrimination of Functional Groups with Scanning Tunneling Microscopy Using Chemically Modified Tips: Recognition of Ether Oxygens through Hydrogen Bond Interactions” *Phys. Chem. Chem. Phys.* **2001**, *3*, 1867-1869.
10. T. Ohshiro, T. Ito, P. Bühlmann, Y. Umezawa “Scanning Tunneling Microscopy with Chemically Modified Tips: Discrimination of Porphyrin Centers Based on Metal-Coordination and Hydrogen Bond Interactions” *Anal. Chem.* **2001**, *73*, 878–883.
9. T. Ito “Ion-Channel-Mimetic Sensor for Trivalent Cations Based on Self-Assembled Monolayers of Thiol-Derivatized 4-Acyl-5-Pyrazolones on Gold” *J. Electroanal. Chem.* **2001**, *495*, 87-97.
8. T. Ito, P. Bühlmann, Y. Umezawa ”Polypyrrole-Modified Tips for Functional Group Recognition in Scanning Tunneling Microscopy” *Anal. Chem.* **1999**, *71*, 1699–1705.
7. T. Ito, D. Citterio, P. Bühlmann, Y. Umezawa “Observation of Silver and Hydrogen Ion Binding to Self-Assembled Monolayers with Chemically Modified AFM Tips” *Langmuir* **1999**, *15*, 2788–2793.
6. K. Odashima, T. Ito, K. Tohda, Y. Umezawa “A Systematic Study on the Complexation of Quaternary Ammonium Salts and Neutral Phenols” *Chem. Pharm. Bull.* **1998**, *46*, 1248–1253.
5. T. Ito, H. Radecka, K. Tohda, K. Odashima, Y. Umezawa ”On the Mechanism of Unexpected Potentiometric Response to Neutral Phenols by Liquid Membranes Based on Quaternary Ammonium Salts – Systematic Experimental and Theoretical Approaches” *J. Am. Chem. Soc.* **1998** *120*, 3049–3059.
4. T. Ito, H. Radecka, K. Umezawa, T. Kimura, A. Yashiro, X. M. Lin, M. Kataoka, E. Kimura, J. L. Sessler, K. Odashima, Y. Umezawa ”A Variety of Lipophilic Amines Incorporated in Liquid Membranes Exhibit Potentiometric Responses to Neutral Phenols” *Anal. Sci.* **1998**, *14*, 89-98.

3. T. Ito, P. Bühlmann, Y. Umezawa "Scanning Tunneling Microscopy Using Chemically Modified Tips" *Anal. Chem.* **1998**, *70*, 255–259.
2. T. Ito, M. Namba, P. Bühlmann, Y. Umezawa "Modification of Silicon Nitride Tips with Trichlorosilane Self-Assembled Monolayers (SAMs) for Chemical Force Microscopy" *Langmuir* **1997**, *13*, 4323–4332.
1. H. Sato, M. Wakabayashi, T. Ito, M. Sugawara, Y. Umezawa "Potentiometric Responses of Ionophore-Incorporated Bilayer Lipid Membranes with and without Added Anionic Sites" *Anal. Sci*. **1997**, *13*, 437–446.

Reviews/Accounts/Proceedings (Slightly- or Non-Peer-Reviewed Publications)

5. T. Ito "Separation and Detection Methods Based on Nanoscale Mass Transport through a Carbon Nanotube" (Japanese review) *Bunseki*, **2008**, in press.
4. T. Ito, S. M. Forman, C. Cao, C. R. Eddy, Jr., M. A. Mastro, R. T. Holm, R. L. Henry, K. Hohn, J. H. Edgar "Monolayer Formation on GaN Surface via Self-Assembly" *ECS Transactions*, **2007**, *11*, 97-101.
3. T. Ito "Atomic Force Microscopy and Scanning Tunneling Microscopy with Chemically Modified Tips" (Japanese review) *Bunseki*, **2005** (January) 23-29.
2. T. Ito, Y. Umezawa "Scanning Tunneling Microscopy with Chemically Modified Tips" *Rev. Anal. Chem.* **2000**, *19*, 331–359.
1. Y. Umezawa, M. Sugawara, K. Tohda, P. Buhlmann, Y. Tani, S. Nishizawa, S. Amemiya, T. Ito, N. Kimura "Chemical Sensors 1993/1994 - Ion Sensors" (Japanese review) *Chemical Sensors* **1994**, *10*, 46-60.

Textbooks, Handbooks

3. T. Ito "Chemically Modified Tips for Atomic Force Microscopy (AFM) and Scanning Tunneling Microscopy (STM)" in *Frontiers in Methods of Analysis –Fundamentals and Applications to Nano and Biotechnology–* (Japanese handbook), Y. Umezawa, T. Sawada, and S. Terabe, Eds., NTS Inc., Tokyo, Japan, **2004**, 289-297.
2. Y. Umezawa, T. Ito "Scanning Probe Microscopy (SPM)" in *Data Book on Analytical Chemistry* (Japanese handbook), Japan Society of Analytical Chemistry, Eds., Maruzen, Tokyo, Japan, **2004** (September), pp 177-178.
1. T. Ito "Scanning Probe Microscopy (STM, AFM, SECM)" in *Experiments in Instrumental Analysis* (Japanese textbook), Y. Umezawa, S. Motomizu, H. Watarai and N. Teramae, Eds., Tokyo Kagaku Dojin, Tokyo, Japan, **2002** (March), pp 260-274, 280-282.

Other Publications

4. T. Ito "To Work at a University in Kansas" *Chemistry Today* (Japanese magazine), **2006**, *426*, 31-35.
3. "2003 The Japan Society for Analytical Chemistry Award for Young Researchers" *Bunseki*, **2003** (September) 543.
2. "Texas A&M University" (Japanese)
   T. Ito *SUT Bulletin* **2003**, *No. 224*, 65.
1. T. Ito "Scanning Probe Microscopy Using Chemically Modified Tips" (Japanese minireview) *Bunseki Kagaku* **1999**, *48*, 867–868.

List of recent presentations (2004~)

A. Invited presentations

5. T. Ito "Undergraduate Lab Experiments Involving Nanoscience: Vitamin C Sensors Based on Monolayers and Microscopic Observation of DNA Molecules", *Kansas College Chemistry Teacher's Conference*, Manhattan, KS, April, **2008**.
4. T. Ito, Y. Li, H. C. Maire "Electrochemical Characterization of Nanoporous Films Fabricated from a Polystyrene–Poly(methylmethacrylate) Diblock Copolymer: Monitoring the Removal of the PMMA Domains and Exploring the Functional Groups on the Nanopore Surface", *Pittcon 2008*, New Orleans, March, **2008**.
3. T. Ito, S. M. Forman, C. Cao, F. Li, C. R. Eddy, Jr., M. A. Mastro, R. T. Holm, R. L. Henry, K. Hohn, J. H. Edgar "Monolayer Formation on GaN Surface via Self-Assembly" *212th Electrochemical Society Meeting*, Washington DC, October, **2007**.
2. T. Ito "Multiphoton Photolithography: Fundamental Studies and Applications" *International Open Symposium on Nanoscience and Nanotechnology*, Noda, Japan; January, **2007**.

B. Schools, National Labs

9. T. Ito "Multiphoton Photolithography: Fundamental Studies and Applications" *Department Seminar, Pittsburg State University,* Pittsburg, Kansas, November, **2006**.
8. T. Ito, Li Sun, Richard M. Crooks "Analytical Applications of Single Carbon Nanotube Membranes" *Analytical Seminar*, *University of Kansas,* Lawrence, Kansas, October, **2004**.
7. T. Ito "Analytical Applications of Single Carbon Nanotube Membranes" (Japanese) *Seminar at Nanoarchitectonics Research Center, National Institute of Advanced Industrial Science and Technology (AIST),* Tsukuba, Japan; June, **2004**.
6. T. Ito "Analytical Applications of Single Carbon Nanotube Membranes" (Japanese) *Symposium of JSAC and CSJ at Utsunomiya Region, Utsunomiya University,* Utsunomiya, Japan; June, **2004**.
5. T. Ito "Analytical Applications of Single Carbon Nanotube Membranes" (Japanese) *Chemical Resources Laboratory, Tokyo Institute of Technology,* Yokohama, Japan; June, **2004**.

C. In KSU Campus

5. T. Ito "Direct Observation of Molecules" (20 minute talk) *1st Annual Chemistry Symposium at Kansas State University*, May, **2007**.
4. T. Ito "Fabrication and Characterization of Nanopore-Array Electrodes" *KSU Chemistry Department Seminar* (Midtenure seminar), April, **2007**.
3. T. Ito "Study on Chemical Interactions within Nanopores for Developing Biosensors" *Condensed Matter Seminar (Physics Department, KSU)*, Manhattan, KS, USA, December, **2005**.
2. T. Ito "Study on Chemical Interactions within Nanopores for Developing Biosensors" *Seminar Series of "Center for Sensors and Sensor Systems (KSU Targeted Excellence Program)"*, Manhattan, KS, USA, November, **2005**.
1. T. Ito "Biosensing Based on an Electrode Coated with a Nanopore-Array Membrane" *Chemical Engineering Seminar, Kansas State University*, Manhattan, Kansas, December, **2004**.

D. Oral presentations

11. T. Ito, Y. Li "Electrochemical Characterization and Application of Chemically Functionalized Cylindrical Nanopores Prepared from a Diblock Copolymer" (10-min talk at the Open Session), *Gordon Research Conference on Electrochemistry*, Ventura, CA; January, **2008**.
10. T. Ito, Y. Li, H. C. Maire "Electrochemical Characterization of the Surface Charge of Nanoscale Pores in Nanoporous Films Fabricated from a Polystyrene–Poly(methylmethacrylate) Diblock Copolymer" *42nd Midwest Regional Meeting of the American Chemical Society*, Kansas City, MO, November, **2007.**

9. T. Ito, D.-M. N. Perera "Electrochemical Studies of Recessed Nanodisk-Array Electrodes Prepared from Track-Etched Membranes" *211th Electrochemical Society Meeting*, Chicago, IL, May, **2007**.
8. T. Ito, L. Sun, M. A. Bevan, R. M. Crooks "Analytical Applications of Coulter Counters Based on a Multiwall Carbon Nanotube (MWNT)" *205th Meeting of the Electrochemical Society*, San Antonio, TX, USA, May, **2004**.

E. Posters

10. T. Ito, Y. Li "Electrochemical Characterization and Application of Chemically Functionalized Cylindrical Nanopores Prepared from a Diblock Copolymer" *Gordon Research Conference on Electrochemistry*, Ventura, CA; January, **2008**.
9. T. Ito, S. M. Forman, T. A. Everett, A. Xie, X. Yao, D. A. Higgins "Fabrication of ITO Recessed Microelectrodes with Direct-Write Multiphoton Lithography" *Gordon Research Conference on Electrochemistry*, Buellton, CA, USA, February, **2006**.
8. T. Ito, A. A. Audi, H. C. Maire "Nanopore-Array Electrodes for Chemical Sensing" *Gordon Research Conference on Electrochemistry*, Ventura, CA, USA, February, **2005**.

F. Presentation by other people (students, collaborators)

5. H. C. Maire, Y. Li, S. Ibrahim, T. Ito "AFM and Electrochemical Studies on the Orientation of Cylindrical Domains in Polystyrene-Poly(methylmethacrylate) Diblock Copolymer Films" *13th annual K-State Research forum*, Manhattan, KS, March, **2008**. [First prize in oral presentations of graduate students]
4. S. Ibrahim, D. A. Higgins, T. Ito "Direct-Write Multiphoton Photolithography: A Systematic Study of the Etching Behaviors in Various Commercial Polymers" *42nd Midwest Regional Meeting of the American Chemical Society*, Kansas City, MO, November, **2007**.
3. H. C. Maire, Y. Li, S. Ibrahim, T. Ito "AFM and Electrochemical Studies on the Orientation of Cylindrical Domains in Polystyrene-Poly(methylmethacrylate) Diblock Copolymer Films" *42nd Midwest Regional Meeting of the American Chemical Society*, Kansas City, MO, November, **2007**.
2. H. Zhao, K. M. Winston, S. Nagasaka, T. Ito, D. H. Hua "Synthesis and Potential Applications of Self-Assembled Diacetylenes and Their Polymers Derived from Triglycerides" *Bio-Materials By Design Symposium*, Manhattan, KS, USA, January, **2006**.
1. P. Venukadasula, J.-F. Zhang, T. Ito, S. X. Sun, D. H. Hua "Synthesis and Characterization of Triglyceride Polymers, Renewable Materials" *229th ACS Spring National Meeting*, San Diego, CA, USA, March, **2005**.

Course Taught (KSU, Chemistry)

CHM371 Chemical Analysis	Fall 2004, Spring 2006, Fall 2008
CHM596 Physical Methods Lab	Spring 2005, Spring 2007
CHM940 Chemical Microscopy	Fall 2005, Fall 2007
CHM944 Electroanalytical Chemistry	Fall 2006
(CHM901 Analytical Group Seminar	Fall 2005, Spring 2007, Fall 2008)

Graduate Students

Helene C. Maire	(2004 – present)
Shaida Ibrahim	(2005 – present)
Neluni Perera	(2005 – present)
Feng Li	(2007 – present)
Bipin Pandey	(2007 – present)

Undergraduate Students, Summer Students

Gregory Dible	(2005)
Kizzy M. Winson	(2005, summer)
Deletria Battle	(2005, summer, SUROP undergrad.)
Sarah Forman	(2005 – 2007)

Postdoc

Dr. Ahmad A. Audi	(2006)
Dr. Yongxin Li	(2007 – present)

Visiting Scientists

Dr. Iwona Szymanska	(2006 – 2007)