

Curriculum Vitae

PERSONAL INFORMATION

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EDUCATION

- Ph.D., 2003 Department of Chemistry, National University of Singapore, Republic of Singapore
Thesis title "*Analytical Applications of Self-Assembled Biomolecules*"
Advised by Prof. Sam F.Y. Li.
- M.Sc., 1998 Department of Chemistry, Fudan University, Shanghai, P. R. China
Thesis title "*Capillary Electrophoresis – Electrochemical Detection and its Applications*"
Advised by Prof. Wu Xingliang
- B. S., 1995 Department of Chemistry, Anhui University, Hefei, P. R. China
Thesis title "*Analytical Applications of Oscillating Chemical Reaction*"
Advised by Prof. Zhao Xiangda

PROFESSIONAL EXPERIENCE

- 10/2004 – current Post Doctoral Fellow, Centre d'Élaboration de Matériaux et d'Études Structurales, C.N. R. S., Toulouse, France
- 09/2002 – 09/2004 Research Fellow, Department of Chemistry, National University of Singapore, Republic of Singapore.
- 12/1998 – 08/2002 Ph.D. candidate, teaching assistant, Department of Chemistry, National University of Singapore, Republic of Singapore.
- 09/1995 – 07/1998 M.Sc. graduate student, teaching assistant, Department of Chemistry, Fudan University, Shanghai, P. R. China.

RESEARCH BACKGROUND

09/2004 – current

Modified AFM probe related research and applications; Nanoscale dispensing of liquid by Atomic Force Microscopic probes: fundamentals and its applications. Droplets of atto liter liquid with size down to 70nm can be reproducibly deposited onto substrate of interest. Studies are directed towards dispensing of liquid for nanopatterning in nanoelectronics and biological sciences, specifically, nanopatterning of macromolecules as templates for in-situ synthesis of nanoparticles.

09/2002 – 09/2004

Microfabrication and microstructures: rapid reaction screening or scaling of reactions from laboratory to pilot plant scale. Research was aimed at innovative designs towards high throughput microreactions as well as on-chip integration of reaction, pre-concentration, separation and detection - μ TA. Microfabrication of microreactor by MEMS & NEMS technology; chip bonding; synthesis of polymer blocks, PS-PV2P, stabilized palladium catalyst and its immobilization onto the microfluidic channels for successful *Suzuki* Coupling microreaction.

01/1999 – 08/2002

Self-Assembled Biomolecules: techniques and immobilization approaches for direct, one-step attachment of biomolecules onto novel surfaces and its potential applications in biosensor systems and functional analysis. Specifically,

 Microlithography and soft lithography: Micropatterning of biomolecules on surfaces;

 Surface chemistry and surface characterizations by scanning probe microscopy (AFM and STM), scanning electron microscopy, attenuated total internal reflection Fourier Transform Infra-red spectroscopy, laser confocal microscopy, quartz crystal microbalance, optical microscopy, x-ray photoelectron spectroscopy, thin film x-ray diffraction;

 Novel strategies for study of antibody-antigen interaction, protein-small ligand interaction and point mutations and SNPs in genetic diagnoses based on direct attachment of arrayed biomolecules onto surfaces;

 Interfacial electrochemistry; mechanisms of interfacial electron transfer between semiconductor electrode and immobilized proteins or small biomolecules;

 Design and development of biosensors and their applications: glucose biosensor;

 Protein microarrays and DNA microarrays. Direct arraying antibody for allergy diseases screening. Protein characterizations by CIPHERGEN ProteinChip® system. Direct arraying of oligonucleotides with carboxyl modifier on metal oxide chip: solid hybridization techniques; minisequencing technique for analysis of point mutations and single nucleotide polymorphisms in thalassaemia diagnostics;

 Capillary electrophoresis of biomolecules: conventional and microchip-based studies.

09/1995 – 07/1998

Analytical chemistry: separation and analysis by capillary electrophoresis, capillary electrochromatography, HPLC and GC-MS; electrochemical detection of small biomolecules.

SCIENTIFIC PUBLICATIONS

1. Wu, X., Fang, A., Zhang, X. An electrochemical Cell for End-Column Amperometric Detection in Capillary Electrophoresis. *Chinese J.Chromatogr.*, **17**, 1999, 190.
<http://www.bjb.dicp.ac.cn/sepu/1999/1999-02-0190.pdf>
2. Fang, A., Ng, H.T., Su, X.D., Li, S.F.Y. Soft lithography-mediated submicrometer patterning of self-assembled monolayer of hemoglobin on ITO surfaces. *Langmuir*, **16**, 2000, 5221.
<http://pubs.acs.org/cgi-bin/archive.cgi/langd5/2000/16/i12/pdf/la991574o.pdf>
3. Fang, A., Ng, H.T., Li, S.F.Y. Anchoring of self-assembled hemoglobin molecules on bare indium-tin oxide surfaces. *Langmuir*, **17**, 2001, 4360.
<http://pubs.acs.org/cgi-bin/article.cgi/langd5/2001/17/i14/pdf/la001627y.pdf>
4. Ng, H.T., Foo, M.L., Fang, A., Li, J., Jaenicke, S., Xu, G.Q., Chan, L., Li, S.F.Y. Soft lithography-mediated CVD of architected carbon nanotube networks on elastomeric polymer. *Langmuir*, **18**, 2002, 1.
<http://pubs.acs.org/cgi-bin/article.cgi/langd5/2002/18/i01/pdf/la0108095.pdf>
5. Ng, H.T., Fang, A., Li, J., Li, S.F.Y. Flexible carbon nanotubes membrane sensory system - A generic platform. *J. Nanosci. Nanotechnol.*, **1**, 2001, 375.
<http://www.catchword.com/rpsv/cw/asp/15334880/v1n4/s2/p375>
6. Fang, A., Ng, H.T., Huang L., Li, S.F.Y. Protein microarrays on ITO surfaces by a direct covalent attachment scheme. *Langmuir* **18**, 2002, 6324.
<http://pubs.acs.org/cgi-bin/article.cgi/langd5/2002/18/i16/pdf/la0255828.pdf>
7. Fang, A., Ng, H.T., Li, S.F.Y. A high performance glucose biosensor based on monomolecular-layered glucose oxidase on indium-tin oxide. *Biosens. Bioelectron.* **19**, 2003, 43-49.
http://www.sciencedirect.com/science?_ob=MImg&_imagekey=B6TFC-48JSKK6-2-P&_cdi=5223&_user=1697459&_orig=browse&_coverDate=10%2F30%2F2003&_sk=999809998&_view=c&_wchp=dGLbVtb-zSkWz&_md5=73497978a75cae2582aea11d04ab8ffe&_ie=/sdarticle.pdf
8. Fang A., Lee H. K., Valiyaveettil S. Microfluidic Channels modified with Colloidal Palladium as an Efficient Catalyst for High Throughput Suzuki Coupling Reactions. *Intl. J. Comp. Eng. Sci* 2003, **4**, 683-686.
<http://www.worldscinet.com/ijces/04/0403/S1465876303002040.html>
9. Fang, A. Ng, K., Lee, H. K., Valiyaveettil, S. Surface Engineering of Microfluidic Channels: Continuous Flow Suzuki Coupling Catalyzed by Polystyrene-co-Poly(4-vinylpyridine)-Palladium Nanoparticles. *In preparation*
10. Fang, A.; Ondarçuhu, T.; Dujardin, E; et al Dispensing of Nanodroplets down to 70 nm.
To be submitted

CONFERENCE PUBLICATIONS

1. Li, J.; Ng, H. T.; Foo, M.; Fang, A.; Lim, R. Y. H; Zhang, W.; Xing, Y.; Jaenicke, S.; Li, S. F. Y. The fabrication of carbon nanotubes for nanodevices and biosensors. MRS Fall Meeting, Nov. 27- Dec. 1, 2000, Boston, Massachusetts, USA.

2. Fang A., Ng H. T., Huang L., Li S. F. Y. Protein Chips Based on Indium-tin-oxide Slides. ACS ProSpectives Conferences Series: Defining the Proteomics Agenda, Oct. 7-10, 2001, Leesburg, Virginia, USA.
3. Fang A., Lee H. K., Valiyaveetil, S. Microfluidic Channels Modified with Colloidal Palladium as an Efficient Catalyst for High Throughput *Suzuki* Coupling Reactions. 2nd International Conference on Materials for Advanced Technologies & IUMRS, Jun 29 – July 4, 2003 (rescheduled to Dec 7-12, 2003), Singapore.
4. Fang A., Wu J., Valiyaveetil, S, Lee, H. K. Preparation of β -Cyclodextrin Immobilized Capillaries for Open-Tubular Capillary Electrochromatography. Singapore International Chemical Conference III, Dec 15-17, 2003, Singapore.
5. Fang, A., Lee, H. K., Valiyaveetil, S. Polystyrene-co-Poly(4-vinylpyridine)-Palladium Nanoparticles as Efficient Catalyst for Continuous Flow *Suzuki* Coupling Reaction. ICCE-11, Aug 8-14, 2004, S. Carolina, USA.
6. Fang, A.; Ondarçuhu, T.; Dujardin, E. Nanoscale Dispensing of Droplets: a Dynamics Study. First International Nanofluidics Workshop, Apr.18-20, 2005, Bad Boekelo, The Netherlands.

RESEARCH INTEREST

Nanoscience and nanotechnology;
Nanostructures: bottom up as well as top-down approaches and their applications;
Surface chemistry; surface interfacial processes;
Manipulation of biological macromolecules at the nanoscale;
Biosensors: architecture, fabrication and signal transduction;
Functional polymers for reaction engineering.
Microfluidic networks for μ TAS;

REFERENCE

Dr. Christian JOACHIM
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