

Songyan Zheng

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Education

University of Tokyo, Ph.D. in Physical Chemistry 1992 – 1998

Developed methods and instrumentation for synchrotron-based x-ray spectroscopic techniques such as XANES and XRF, especially XRF combined with X-ray excited current. Applied these techniques to catalysts, surface contamination of Si wafer, fine particles and metal thin films. This technique has been included in “Encyclopedia of Analytical Chemistry” (John Wiley & Sons Ltd, Chichester, UK 2000).

Supervisor: Professor Yohichi Gohshi

BS in Analytical Chemistry
Chengdu University of Science and Technology, P.R.China 1983 – 1987

Research Experiences

University of Pennsylvania, Postdoctoral Fellow, in Biophysical Chemistry 1998 – 2000
Research Associate, in Biophysical Chemistry 2000 ~

Conducted structural studies of peptides incorporated into phospholipid monolayers at the air/water interface and on solid substrates via x-ray reflectivity, grazing incidence diffraction and neutron reflectivity. Also conducted research in various disciplines including purification of membrane proteins, self-assembly monolayers and alkylation. Developed model-independent data analysis method for experimental data obtained from x-ray scattering and neutron scattering. Designed and implemented solid phase synthesis of model peptides that mimic the properties of natural redox membrane proteins.

Supervisor: Professor J. Kent. Blasié

Shanghai Chlor-Alkali Chemical Co., LTD, China, Analytical Chemist 1987 – 1991
Performed analytical research and development activities for the purpose of improving a manufacturing process and routine products analysis for quality assurance and quality control.

Teaching Experience

Community college of Shanghai Chlor-Alkali Chemical Co., Ltd, China Adjunct Lecturer 1987 – 1991
Taught analytical methodology and instrumentations, including Gas chromatography chromatography, reversed phase chromatography, HPLC and titration.

University of Tokyo, Teaching Assistant

Applications of spectrometry in surface analysis 1995 – 1996
Surface chemistry 1996 – 1997

Technical Skills

X-ray scattering	Neutron Scattering
X-ray fluorescence (XRF)	X-ray absorption near edge structure (XANES)
X-ray photoelectron spectroscopy (XPS)	Grazing-incidence X-ray diffraction
Total-electron-yield (TEY)	Conversion-electron-yield (CEY)
Langmuir-monolayer	Langmuir-Blodgett films

Gas chromatography (GC)
GC-mass spectroscopy
Chromatography
UV spectroscopy
Wet chemistry

High performance liquid chromatography (HPLC)
MALDI-TOP mass spectroscopy
Reversed phase chromatography
Atomic adsorption spectroscopy (AA)

Computer Languages: UNIX, C-plot, Mathematica.

Awards and Scholarships

1. Foreign student scholarship, financially supported by the Ministry of Education, Science Sport and Culture, Japan 1992 – 1998
2. International student science award from the Association of International Education of Japan 1997

Professional Societies

The Japan Society for Analytical Chemistry (1995-1998)
The Japan Society for Synchrotron Radiation (1995-1998)
Biophysical Society (present)
American Chemistry Society (present)

Publications

1. Solution to the phase problem for specular x-ray or neutron reflectivity from thin films on liquid surfaces
J. Kent Blasie, Songyan Zheng and Joseph Strzalka
Phys. Rev. B 67, 224201 (2003)
2. Comparative Structural Studies of Vpu Peptides in Phospholipid Monolayers by X-Ray Scattering
Songyan Zheng, Joseph Strzalka, David H. Jones, Stanley J. Opella, and J. Kent Blasie
Biophys. J. 2003 84: 2393-2415.
3. Structural Studies of the HIV-1 Accessory Protein Vpu in Langmuir Monolayers: Synchrotron X-ray Reflectivity
Songyan Zheng, Joseph Strzalka, Che Ma, Stanley J. Opella, Benjamin M. Ocko, and J. Kent Blasie
Biophys. J. 2001 80: 1837-1850.
4. Localization of the Cytoplasmic and Transmembrane Domains of the HIV-1 Accessory Protein Vpu within Phospholipid Monolayers by X-ray Reflectivity: Comparison of Full-Length Vpu₂₋₈₁ with the Sub-molecular Fragments Vpu₂₋₅₁ and Vpu₂₋₃₇ on the Effects of Surface Pressure
Zheng, S., Strzalka, J., Jones, D., Opella, S.J. and Blasie, J.K. 2003b
In preparation for submission to Biophys. J.
5. Amphiphilic 4-Helix Bundles Designed for BioMolecular Materials
Ye S, Discher BM, Strzalka J, S Zheng, Dutton PL and Blasie JK
Submitted to Langmuir
6. Amphiphilic 4-Helix Bundles Designed for Light-Induced Electron Transfer Across A Soft Interface
Ye S, Discher BM, Strzalka J, S Zheng, Dutton PL and Blasie JK
In preparation for submission to Nature
7. Positional Order and Thermal Expansion of Surface Crystalline n-Alkane Monolayers
B.M Ocko, E.B. Sirota, M. Deutsch, E. Dimasi, S. Coburn, Joe Strzalka,
Songyan Zheng, Andrey Tronin, Thomas Gog, and Chitra Venkataraman.
Phys. Rev. E 63, 032602 (2001)
8. An Experimental Comparison between Conversion-Electron-Yield and X-ray Fluorescence in Catalyst Analysis

Songyan ZHENG and Yohichi GOHSHI
J. Synchrotron Rad., 5, 102-1034 (1998)

9. Chemical State Observation of Ni Adsorbed on Zeolite by the Conversion-Electron-Yield Method
Songyan ZHENG and Yohichi GOHSHI
Analytical Sciences., Vol.13, 103-108 (1997)
10. A Simulation Study of Signal to Background Ratio of XANES by Total-Electron-Yield at Grazing Angle
Songyan ZHENG and Yohichi GOHSHI,
Analytical Sciences., Vol.13, 997-1001 (1997)
11. An Experimental Comparison between Total-Electron-Yield and Conversion-Electron-Yield for Near-surface Characterization Using X-ray Excitation
Songyan ZHENG, Shinjiro HAYAKAWA and Yohichi GOHSHI,
J. Electron Spectrosc. Relat. Phenom., 87, 81-89 (1997)
12. Trace Element Detection Utilizing Sample Current Jump Around X-ray Absorption Edge
Xiuchun ZHAN, Shinjiro HAYAKAWA, Songyan ZHENG and Yohichi GOHSHI
Adv. in X-ray Chem. Anal. Jpn., 26, 103-106 (1995)
13. Depth Selective Chemical State Analysis of Fine Particles Using X-ray Absorption
Jun KAWAI, Shinjiro HAYAKAWA, Fumitaka ESAKA, Songyan ZHENG, Yoshinori KITAJIMA,
Kuniko MAEDA, Hirohiko ADACHI, Yohichi GOHSHI and Keiichi FURUYA
Anal. Chem., 67, 1526-1529 (1995)
14. Depth Selective Chemical State Analysis of Fly Ash with Simultaneous XANES Measurement of Total-Electron-Yield and X-ray Fluorescence Yields
Jun KAWAI, Shinjiro HAYAKAWA, Songyan ZHENG, Yoshinori KITAJIMA, Hirohiko ADACHI,
Yohichi GOHSHI, Fumitaka ESAKA and Keiichi FURUYA
Physica B 208 & 209, 237-238 (1995)
15. Sulfur K-edge XAFS Measurements of Fly Ash with X-ray Excited Sample Current Detection.
Songyan ZHENG, Jun Kawai, Shinjiro HAYAKAWA, Keiichi FURUYA, Yoshinori KITAJIM and
Yohichi GOHSHI
Adv. in X-ray Chem. Anal., 26, 217 (1995)
16. Depth Selective X-ray Absorption Fine Structure Spectrometry
Jun KAWAI, Shinjiro HAYAKAWA, Songyan ZHENG, Kazuo KOBAYASHI, Kuniko MAEDA, Yoshinori
KITAJIMA and Yohichi GOHSHI
Spectrochimica Acta., 49B, 739-743 (1994)
17. Separation of Gold by Reversed-Phase Chromatography.
Longhua TAN and Songyan ZHENG,
Rock and Mineral Anal. 8(1) 66 (1989)
18. Reversed-Phase Separation Chromatography and Determination of Lithium in Halowater and Ores.
Longhua TAN, Lichang YANG, Haitao SONG and Songyan ZHENG,
Anal. Chem., 16(6) 576 (1988)

Selected Conferences

1. Localization of the Cytoplasmic and Transmembrane Domains of the HIV-1 Accessory Protein Vpu Within Phospholipid Monolayers by X-ray Reflectivity: Comparison of Full-Length Vpu₂₋₈₁ with the Sub-molecular Fragments Vpu₂₋₃₇ and Vpu₂₋₅₁
Songyan ZHENG, J. Strzalka, David H. Jones, S. J. Opella and J.K. Blasie

National Institute of General Medical Sciences
Bethesda, Maryland, June 19-21, 2002

2. Comparative Studies of the HIV-1 Accessory Protein Vpu and Its Fragments in Langmuir Monolayers: X-ray Reflectivity and Grazing Incidence Diffraction
Songyan ZHENG, J. Strzalka, David H. Jones, C. Ma, S. J. Opella and J.K. Blasie
National Institute of General Medical Sciences
Bethesda, Maryland, June 20-22, 2001
3. Structural Studies of the HIV-1 Accessory Protein Vpu and Its Fragments Vpu₂₋₅₁ and Vpu₂₋₃₇ in Langmuir Monolayers via Synchrotron X-ray Reflectivity
Songyan ZHENG, J. Strzalka, C. Ma, S. J. Opella, B. Ocko and J.K. Blasie
45th Annual Meeting, Biophysical Society
Boston, Massachusetts, February 17-21, 2000
4. Structural Studies of the HIV-1 Accessory protein Vpu in Langmuir Monolayers via Synchrotron X-ray Reflectivity
Songyan ZHENG, J. Strzalka, C. Ma, S. J. Opella, B. Ocko and J.K. Blasie
National Institute of General Medical Sciences
Bethesda, Maryland, June 7-9, 2000
5. Structural Study of HIV-1 Accessory Protein Vpu via Synchrotron X-ray Reflectivity from Langmuir Monolayers
Songyan ZHENG, J. Strzalka, C. Ma, S. J. Opella, B. Ocko and J.K. Blasie
44th Annual Meeting, Biophysical Society
New Orleans, Louisiana, February 12-16, 2000
6. Structural Studies of Vpu via Pressure Area Isotherms and Synchrotron X-ray Reflectivity
Songyan ZHENG, J. Strzalka, C. Ma, S. J. Opella, B. Ocko and J.K. Blasie
National Institute of General Medical Sciences
Bethesda, Maryland, June 16-18, 1999
7. HIV-1 Accessory Protein Vpu via Synchrotron X-ray Reflectivity from Langmuir Monolayers
Songyan. ZHENG, J. Strzalka, C. Ma, S. J. Opella, B. Ocko and J.K. Blasie
National Institute of General Medical Sciences
Bethesda, Maryland, June 16-18, 1999
8. Surface Analysis by Total-Electron-Yield and Conversion-Electron-Yield Modes Using X-ray Excitation
Songyan ZHENG and Yohichi GOHSHI
The 6th International Conference on Synchrotron Radiation @ Instrumentation
Himeji, Hyogo, Japan, August 4-8, 1997
9. XAFS Measurements of Thin Films Using X-ray Excited Sample Current under Atmospheric Condition.
Songyan ZHENG, Shinjiro HAYAKAWA and Yohichi GOHSHI
International Chemical Congress of Pacific Basin Societies,
Honolulu, Hawaii USA, December 17-22, 1995
10. Trace Element Detection Utilizing Absorption Edge Jump of Sample Current.
X.iuchun ZHAN, Shinjiro HAYAKAWA, Songyan ZHENG and Yohichi GOHSHI
The 5th Workshop Total Reflection X-Ray Fluorescence Spectroscopy and Related Spectroscopical Methods
Tsukuba, Japan October 17-19, 1994
11. X-Ray Excited Sample Current Measurements under Total Reflection Condition.

Shinjiro HAYAKAWA, Songyan ZHENG and Yohichi GOHSHI
The 5th Workshop Total Reflection X-Ray Fluorescence Spectroscopy and Related Spectroscopical
Methods
Tsukuba, Japan October 17-19, 1994

12. Total Reflection X-Ray Absorption Fine Structure of Semiconductor Wafers.
Jun KAWAI, Shinjiro HAYAKAWA, Songyan ZHENG and Yohichi GOHSHI
The 5th Workshop Total Reflection X-Ray Fluorescence Spectroscopy and Related Spectroscopical Methods
Tsukuba, Japan October 17-19, 1994