

## HARALD ADE

Curriculum Vitae, November 15, 1999

### Campus Address

Department of Physics  
North Carolina State University  
Box 8202  
Raleigh, NC 27695-8202  
919-515-1331

### Permanent Address

201 Promontory Pt. Dr.  
Cary, NC 27513  
919-481-9361

### Personal

Born in West Germany - married - 2 children - Permanent Resident

### Educational Background

Ph.D. Physics - State University of New York, Stony Brook, December 1990  
Vordiplom Physics - University of Tübingen, FRG, September 1983

### Professional Employment and Experience

1997 - Present Assoc. Professor of Physics, North Carolina State University, Raleigh, NC  
1992 - 1997 Asst. Professor of Physics, North Carolina State University, Raleigh, NC  
1990 - 92 Postdoctoral Associate, X-ray Spectro-Microscopy, SUNY, Stony Brook, NY  
1986 - 90 Graduate Research Assistant, X-ray Microscopy, SUNY Stony Brook, NY  
1985 - 86 Teaching Assistant, Dep. of Physics, SUNY, Stony Brook, NY

### Honors and Awards

1995 Proctor & Gamble Presidential Faculty Fellow Support Program  
1995 Sigma Xi Research Award, North Carolina State University Chapter  
1994 - 99 NSF Young Investigator Award  
1994 - 97 DuPont Young Professor Grant  
1994 Finalist, Proctor&Gamble University Exploratory Research Program.  
1991 R&D 100 Award  
1984 - 85 Exchange Student Fellowship, Stony Brook, New York

### Consulting

1996,'97,'99-2001 Consultant to The Dow Chemical Company  
1995 Consultant to AlliedSignal Inc.  
1995 Consultant to Polaroid  
1991 - 1995 Consultant to EXXON Research and Engineering  
1991 Consultant to Sincrotrone Trieste

### Professional Societies

1985 - Present American Physical Society  
1992 - Present American Association for the Advancement of Science  
1993 - Present Microscopy Society of America, Microanalysis Society of America  
1993 - Present Materials Research Society  
1995 - Present Sigma Xi  
1993 - 1994 Optical Society of America

### **Professional Services**

2000-01	Member, Program Committee, VUV'2001, Trieste, Italy
1999-00	Member, Local Organizing Committee, ICES 8, Berkeley, CA
1998-99	International Advisory Committee, Int. Conference on X-ray Microscopy XRM99
1998	Co-Organizer/Facilitator, Polymer Breakout Group, Workshop on Scientific Directions at the Advanced Light Source, Berkeley (March 23-25, 1998)
1998	Member, Task Force, "World Class User Program for the ALS", Berkeley, CA.
1997- 1998	Co-Organizer, Workshop on "X-ray Microscopy of Polymers", NIST, May 11-12, 1998
1997- 1998	Coordinator/Organizer, six workshops at NSLS user meeting 1998, BNL
1996 - present	Member, Editorial Board, J. Electron. Spectrosc.
1996 - 1998	Member, General User Oversight Committee, NSLS, BNL
1996	Organizer, Workshop on "Spectromicroscopy", LBNL, Berkeley (October 23, 1996)
1996	Session Chair, ALS user meeting, LBNL, Berkeley (October 22, 1996)
1996	Session Chair, International Conference on X-ray Microscopy and Spectromicroscopy, XRM96, Würzburg (August 19-23, 1996)
1996 - present	Member, Sigma Xi Research Awards Committee, NCSU Chapter
1995 - 1996	Co-organizer, Symposium "Applications of Synchrotron Radiation to Materials Science", Spring MRS Meeting, San Francisco (April 8-12, 1996)
1995 - 1997	Editor, "Spectromicroscopy with VUV photons and X-rays", Special Issue, J. Electron Spectrosc.
1995	Session Chair, Advanced Light Source User Meeting, LBNL, Berkeley, CA (Oct. 24, 1995)
1995 - 1998	Member, User Advisory Committee, Duke Free Electron Laser Laboratory, Durham, NC
1995	Member, Local Organizing Committee, 3 <sup>rd</sup> International Conference on Atomically Controlled Surfaces and Interfaces, Raleigh, NC (Oct. 19-21, 1995)
1995	Organizer, Workshop on "Materials Characterization with IR and Soft-x-ray Microscopy at the Duke Free Electron Laser Laboratory", Durham, NC (March 17, 1995)
1994 - 1996	Member, User Executive Committee, Advanced Light Source, LBL
1993-95, 98-99	Member, Program Study Panel, National Synchrotron Light Source, BNL
1993	Session Chair, 51 <sup>st</sup> Annual MSA Meeting, Cincinnati (August 4, 1993)
1992	Presentation to ALS Science Policy Board, LBL, Berkeley, CA (December 16, 1992)
1991	Organizer, Workshop on "Imaging with X-rays", BNL (May 20, 1991)
1990 - Present	Reviewer for Professional Journals: Phys. Rev. Lett., Appl. Phys. Lett., Phys. Rev. B, J. Phys. Chem., J. Electron Spectrosc. Rel. Phenom., J. Microscopy, J. Vac. Sci. Techn., J. Synchr. Rad., Nucl. Instrum. Meth., Scanning, MRS Proc., Surf. Interf. Analysis. and Meteoritics and Planetary Science; and Funding agencies: NSF, DoE, DoD-Army, Research Corp.

### **Patents and Patent Disclosures:**

1. "Rubber Toughening of PMMA via Mechanical Alloying", A.P. Smith, R.J. Spontak, H.W. Ade, C.C. Koch, Patent Disclosure, North Carolina State University, Sept. 1997.
2. "A High Throughput, High Input Power and High Resolution IR Probe for IR Near Field Scanning Optical Microscopy (IR-NSOM)", H. Ade, H. Hallen, P. Russel, D. Griffis, Patent Disclosure, North Carolina State University, Oct.1995.

### Abstract and Poster Awards (students)

- MAS Distinguished Scholar Award – A. P. Smith, Microbeam Analysis Society of America (1998).
- Student Poster Award - Instrumentation and Techniques 1<sup>st</sup> Prize - D.A. Winesett  
Title: “Quantitative Compositional Mapping of Phase Separation in Thin Polymer Films”, D.A. Winesett, H. Ade, A.P. Smith, S. Qu, S. Ge, M. Rafailovich, S. Sokolov, MSA’98 Mtg., Atlanta, (1998)
- Richard D. Gilbert 1<sup>st</sup> Place Award in Polymer Science — “Quantitation of the Lateral Orientational Order in poly(p-phenylene terephthalamide) Fibers with X-ray Linear Dichroism Microscopy”, A.P. Smith, A. Garcia, H. Ade, (1997)
- Poster Winner — “Quantitative Compositional Mapping of Spinodally Decomposing Polymer Films”, D.A. Winesett, H. Ade, A.P. Smith, M. Rafailovich, S. Sokolov, S. Qu, Annual Symposium of the NC MRS Section , RTP, NC (1997)
- Abstract Winner — “Dynamics of Spinodal Decomposition of Thin Films of PS/PMMA Blends”, D.A. Winesett, H. Ade, M. Rafailovich, S. Sokolov, S. Qu, Sixteenth Annual Symposium on Advances in Microscopy’97, Wilmington, NC (1997)
- Poster Award — “Quantitation of the Lateral Orientation Order in poly(p-phenylene terephthalamide) Fibers with X-ray Linear Dichroism Microscopy”, A.P. Smith, A. Garcia, H. Ade, Sixteenth Annual Symposium on Advances in Microscopy’97, Wilmington, NC (1997)
- Invited Presentation Award. NC-MRS Integration of Interdisciplinary Materials Research. Durham, NC. November 22, 1996
- Honorable Mention: Invited Presentation Competition, Richard D. Gilbert Award in Polymer Science. Raleigh NC. May 9, 1996.
- Honorable Mention: North Carolina Society of Microscopy and Microbeam Analysis Student Poster Award; Physical Sciences. Symposium on Advances in Microscopy. Wrightsville Beach, NC. Sept 29-Oct 1, 1995.
- Second Prize: Polymer Science/Chemistry Division, Seventh Annual Southeastern Polymer Graduate Conference. Virginia Tech, Blacksburg, Virginia. (1995)

### Invited Presentations:

1. “STXM microscopy of Polymers”, 7<sup>th</sup> International Synchrotron Radiation Instrumentation Conference, Berlin, Germany (August 21-25, 1999)
2. “NEXAFS Microscopy of Polymers”, Elettra User meeting, Trieste, Italy (November 29, 1999).
3. “Characterizing Polymers with NEXAFS Microscopy”, Seminar, Chemical Engineering and Polymer Materials and Interface Laboratory, Virginia Polytech, (Nov. 16, 1999).
4. “NEXAFS Microscopy of Polymers”, Second international SLS Workshop, Brunnen, Switzerland, (October 27, 1999).
5. **“Thin Film Polymer Morphology and Dynamics”, Colloquium, Physics Department, Notre Dame (September 22, 1999).**
6. **“Polymers in Confined Geometries”, Colloquium, Physics Department, NCSU, Raleigh, NC (September 13, 1999).**
7. “Polymers in Confined Geometries”, Special Lectures Series, ALS, Berkeley (September 2 1999).
8. “Polymer Characterization with NEXAFS microscopy”, Special Lectures Series, ALS, Berkeley (August 26, 1999).
9. **“Morphologies and Dynamics of Polymers in Constraint Systems”, International Conference on X-ray Microscopy – XRM99, Berkeley, CA (August 3, 1999).**

10. "Characterizing the Nanostructure of Natural and Synthetic Polymers with NEXAFS Microscopy", Condensed Matter Seminar, University of California Davis, CA (June 18, 1999).
11. "NEXAFS microscopy: Opportunities in Polymer Science", Seminar, BASF, Ludwigshafen, FRG (January 27, 1999).
12. "Morphology and dynamics of phase separating and dewetting thin polymers films", Seminar, University of Wuerzburg, Wuerzburg, FRG (January 26, 1999)
13. "NEXAFS microscopy: Seeing things in a new light", Seminar, University of Heidelberg, Heidelberg, FRG (January 25, 1999)
14. **"NEXAFS microscopy of polymers: Seeing things in a new light", Seminar, Max-Planck Institute für Polymerforschung, Mainz, FRG (January 21, 1999).**
15. "NEXAFS microscopy: Opportunities in Polymer Science", Seminar, Forschungszentrum Karlsruhe, Karlsruhe, FRG (January 19, 1999).
16. "Characterization of thin film polymer blends and bilayers with NEXAFS microscopy", 2<sup>nd</sup> Workshop on Characterization and Modeling of the Interface/Interphase of Polymeric Materials and Systems, National Institute of Standards and Technology, Gaithersburg, Maryland (Dec 7, 1998)
17. **"NEXAFS microscopy: Dewetting and phase separation in polymer thin films and other applications", Colloquium, Department of Chemistry, University of Nevada, Las Vegas, NV (Nov. 20, 1998).**
18. **"Polymer Science: What can X-ray Spectromicroscopy contribute?", 2<sup>nd</sup> International Conference on Synchrotron Radiation in Materials Science (SRMS-2), Kobe, Japan, (October 31, 1998).**
19. "Spectromicroscopy of Polymers", Symposium on Imaging with Synchrotron Radiation, Japanese Society of Synchrotron Radiation Research, Tokyo, Japan (October 30, 1998).
20. **"NEXAFS Microscopy", International Workshop on Spectromicroscopy, Wisconsin Synchrotron Radiation Center, Madison, WI (October 24, 1998).**
21. "X-ray Spectromicroscopy: Status and Future of the Technology", 4<sup>th</sup> Polyurethane Workshop, Dow Chemical, Freeport, TX (September 23, 1998).
22. **"Characterization of Polymer Microstructure with X-ray Microscopy", International Congress of Electron Microscopy 14, Cancun, Mexico (September 2, 1998)**
23. **"NEXAFS Microscopy: Opportunities in Polymer Science", International Conference of Vacuum and Ultraviolet Physics, VUV-12, San Francisco, CA (August 4, 1998).**
24. "History and Cross-Disciplinary Perspective of Compositional Imaging and Mapping with NEXAFS microscopy", Microscopy and Microanalysis 1998, Atlanta (July 13, 1998).
25. "X-ray Microscopy of Polymers: Past, Present, Future", Workshop on X-ray Microscopy of Natural and Synthetic Polymers: Toward Chemical Speciation at the 10 nm scale, NIST, Gaithersburg (May 12, 1998).
26. "A Free Electron Laser Photoelectron-Emission-Microscope (FEL-PEEM) System", PEEM/LEEM workshop, Tempe, AZ (April 9, 1998).
27. **"Characterization of Alloyed Polymer Blends with X-ray Microscopy", Colloquium, Materials Science and Engineering, NCSU, NC (February 27, 1998).**
28. "Chemical Speciation of Polymers at 50 nm resolution", Workshop on Opportunities for Synchrotron Light in Materials and Manufacturing, Mississauga, ON, Canada (February 10, 1998).
29. "Progress in X-ray Microscopy of Polyurethanes", Workshop, Dow Chemical, Freeport, TX (January 23, 1998).
30. "NEXAFS Microanalysis of Polymers", MICROSCOPY & MICROANALYSIS-97, Cleveland, Ohio (August 10-14, 1997).
31. **"X-ray Spectromicroscopy", Colloquium, Physics Department, Virginia Commonwealth University, Richmond, VA (April 18, 1997).**

32. "X-ray Microscopy of Polymers", Seminar, Department of Physics, UNC-CH, Chapel Hill, NC (April 2, 1997).
33. **"X-ray Microscopy of Polymers and Tribological Surfaces", APS March Meeting, Kansas (March 17, 1997).**
34. **"X-ray Microscopy: An old dream come true?", Colloquium, Department of Physics, NCSU, Raleigh, NC (December 2, 1996).**
35. "X-ray Microscopy", Seminar, National Institute of Standards and Technology, Gaithersburg, MD (November 20, 1996).
36. "Core Edge Spectroscopy Tools", Workshop, Dow Chemical, Freeport, TX (November 11, 1996).
37. "Micro-XANES and Micro-XPS of Polymers", AVS Meeting, Philadelphia, NJ (October 16, 1996).
38. "NEXAFS Microscopy and Linear Dichroism Microscopy: Applications to Polymers", Seminar, Proctor&Gamble, Cincinnati, OH (October 11, 1996).
39. **"X-ray Microscopy", Colloquium, Physics Department, Wake Forest University, Winston-Salem, NC (September 19, 1996).**
40. **"NEXAFS and X-ray Linear Dichroism Microscopy and its Applications to Polymer Science", International Conference on X-ray Microscopy and Spectromicroscopy - XRM96, Würzburg, FRG (August 22, 1996).**
41. "X-ray Microscopy: A Novel, Low Damage Approach to Core Excitation Spectroscopy at High Spatial Resolution", Symposium on "Frontiers in Polymer Microscopy and Microanalysis", 54<sup>th</sup> MSA Meeting, Minneapolis (August 12, 1996).
42. "X-ray Microscopy of Polymers: A Low Dose Approach to Compositional and Directional Analysis", Seminar, Hoechst-Celanese, Summit, NJ (July 19, 1996).
43. **"X-ray Spectromicroscopy", Gordon Conference on Electron Spectroscopy, Hanneker, NH (July 7-12, 1996).**
44. "X-ray Microscopy of Polymers: A Low Dose Approach to Compositional and Directional Analysis", Workshop on "Synchrotron Applications to Polymers", Brookhaven National Laboratory, Upton, NY (May 22, 1996).
45. "Recent X-ray Microscopy Applications with Emphasis on Dow Chemical Interests", Seminar, The Dow Chemical Corporation, Midland, MI (April 25, 1996).
46. "X-ray Microscopy with Zone Plates: Possibilities and Problems", Workshop on "Possibility of X-ray Microscopy at CAMD", Baton Rouge, LA (Feb. 7, 1996).
47. "X-ray Tomography by Phase Contrast", Phase Contrast Tomography Workshop, ESRF, December 1995. Declined.
48. "Study of Polymeric Materials by Scanning Transmission X-ray Microscopy", Workshop on "Phase Morphology in Polyurethanes and Possible Correlations to Physical Properties", The Dow Chemical Company, Freeport, TX (Nov. 14, 1995).
49. "Novel Microscopies with Compositional or Orientational Sensitivity and Their Applications", Condensed Matter Seminar, Dept. of Physics, UNC Chapel Hill, Chapel Hill, NC (Oct. 4, 1995).
50. "Characterization of Industrial Polymeric Products with XANES Microscopy", Seminar, GE, Schenactady, NY (Sept. 11, 1995).
51. "Elemental, Chemical and Orientational Characterization of Easily Damageable Materials with X-ray Microscopy", 53<sup>rd</sup> Microscopy Society of America Meeting, Kansas City, KA (August 14, 1995).
52. "X-ray Microscopy of Polymeric Materials and Sample Preparation Issues", 29<sup>th</sup> Microbeam Analysis Society Meeting, Breckenridge, CO (August 9, 1995).
53. "XANES and Linear Dichroism Microscopy", SPIE International Symposium, "X-ray Microbeam Technology and Applications", San Diego, CA (July 9-14, 1995). Declined.
54. **"Characterization of Polymeric Systems with NEXAFS and X-ray Linear Dichroism Microscopy", Keynote Lecture, Symposium on "Chemical Applications of Synchrotron Radiation", 78<sup>th</sup> Canadian Society for Chemistry Conference, Guelf, Canada (May 29, 1995).**

55. "Compositional and Orientational Characterization of Polymeric Materials", 22<sup>nd</sup> Annual Spring Symposium "Polymer Systems: Surface Properties and Characterization", Michigan Chapter of the American Vacuum Society, Detroit, MI (May 18, 1995).
56. **"Scanning X-ray Photoemission Microscopy", NATO Advanced Research Workshop on "Chemical, Structural and Electronic Analysis of Heterogeneous Surfaces on Nanometer Scale", Trieste, Italy (April 25, 1995).**
57. **"Materials Characterization with XANES Microscopy", Workshop "Science and Technology with Synchrotron Light", Brasilia, Brazil (April 6, 1995).**
58. **"XPS Microscopy: Instrumentation and Applications", Workshop "Science and Technology with Synchrotron Light", Brasilia, Brazil (April 5, 1995).**
59. **"Materials Characterization with X-ray Microscopy", Colloquium, Materials Science Department, SUNY@Stony Brook, Stony Brook, NY (March 20, 1995).**
60. "XPS/XANES Microscopy: Present and Future", Workshop on "Materials Characterization with IR and Soft X-ray Microscopy at the Duke Free Electron Laser Laboratory and at NC STAR", Durham, NC (March 17, 1995).
61. "Polymer Characterization with Synchrotron Based X-ray Microscopy", Seminar, Allied Signal, Morristown, NJ (March 6, 1995).
62. "Birefringence Observation in Near Field Optical Microscopy (and Plans for a Mid-IR Near-field Microscope)", Seminar, Dow Chemical, Midland, MI (December 16, 1994).
63. "Materials Characterization with Synchrotron Based X-ray Microscopy", Lecture, Analytical Science Discussion Group, Dow Chemical, Midland, MI (December 15, 1994).
64. "X-ray Microscopy of Multilayered Films and Other Polymeric Materials", Seminar, Polaroid, Cambridge, MA (December 2 1994).
65. "X-ray and Infrared Microscopy of Polymeric Materials", MRS Fall Meeting, Symposium on "Applications of Synchrotron Radiation Techniques to Materials Science", Boston, MA (December 1, 1994).
66. "Polymer Microscopy: About Balls, Rocks and Other Stuff", ALS User Meeting, Berkeley, CA (October 21, 1994).
67. "New Polymer Imaging Techniques with Compositional and Orientational Sensitivity", Polymer Discussion Group of the North Carolina Section of the American Chemical Society, Raleigh, NC (September 8, 1994).
68. "Chemical and Orientational Imaging of Polymeric Samples", Seminar, Dow Chemical, Freeport, TX (August 4, 1994).
69. "Chemical and Orientational Imaging of Polymeric Samples", Symposium on "X-ray Microscopy", 52<sup>nd</sup> MSA Meeting, New Orleans, LA (August 3, 1994).
70. "Chemically and/or Orientationally Sensitive Techniques with High Spatial Resolution: Their Utilization to Polymer Characterization", Seminar, DuPont, Wilmington, DE (June 10, 1994).
71. "X-ray Microscopy for Industry", Seminar, Charles Evans, Redwood City, CA (April 14, 1994).
72. "Materials Analysis with X-ray Microscopy", NC STAR Industrial Applications Workshop, Raleigh, NC (April 8, 1994).
73. "Applications of Synchrotron Radiation to Polymer Characterization", Pittsburgh Conference, Symposium on "Applications of Synchrotron Radiation in the Chemical Sciences", Chicago, IL (February 28, 1994).
74. "Chemical Contrast X-ray Microscopy", Fall MRS Meeting, Symposium on "Determining Nanoscale Physical Properties of Materials by Microscopy and Spectroscopy", Boston, MA (December 1, 1993).
75. "Characterization of Polymers with X-ray Microscopy", Solid State Seminar, Boston University, Boston, MA (November 30, 1993).

76. **“X-ray Microscopy at the Carbon K Edge of Polymers and Other Materials”, Gordon Conference on X-ray Physics, New London, NH (August 13, 1993).**
77. “X-ray Microscopy in Polymer Science: Prospects of a New Imaging Technique”, 51<sup>st</sup> Annual MSA Meeting, Symposium on “Aspects of Imaging in Polymer Science”, Cincinnati, OH (August 4, 1993).
78. “X-ray Microscopy of Polymers”, Seminar, DuPont, Wilmington, DE (May 11, 1993).
79. “X-ray Microscopy in Polymer Science”, Workshop, FEL-Lab, Duke University, Durham, NC (March 8, 1993).
80. **“C-NEXAFS and Linear Dichroism X-ray Microscopy”, ALS Science Policy Board Meeting, LBL, Berkeley, CA, USA (December 16, 1992).**
81. “Prospects of X-ray Microscopy in Polymer Science”, Seminar, Dow Chemical, Analytical Science Lab, Midland, MI, USA (December 15, 1992).
82. “The Potential of Polarization Dependent XANES Imaging to Determine Bond Orientations in Directionally Ordered Polymers at 50 nm Spatial Resolution”, Seminar, EXXON Research and Engineering, Annandale, NJ, USA (October 21, 1992).
83. “Scanning X-ray Microscopy on the NSLS X1 Undulator Beamline”, SRC User Meeting, Madison, WI, USA (October 5, 1992).
84. “X-ray Microscopy: A Complimentary Technique to Electron Probes?”, 10<sup>th</sup> National Symposium on Advances in Microscopy, Morehead City, NC, USA (September 27, 1992).
85. “X-ray Microscopy: Concepts, Applications, and Prospects”, Seminar, FEL Laboratory, Duke University, Durham, NC, USA (September 23, 1992).
86. “X-ray Spectromicroscopy”, ALS User Meeting, LBL, Berkeley, USA (August 28, 1992).
87. **“X-ray Microscopy: Developments in Biology, Medicine, and Polymer Science”, 10<sup>th</sup> International Conference on VUV Physics, Paris, France (July 28, 1992).**
88. “X-ray Microscopy in Biology and Surface Science”, Workshop, MAX-lab, Lund, Sweden (May 26, 1992).
89. “Scanning Micro-Focus ESCA and XANES Imaging: The Role of Synchrotron Radiation”, Workshop on “Chemical State Imaging”, Daresbury Laboratory, Daresbury, UK (April 25, 1992).
90. “X-ray Microscopy: An Old Quest Revisited”, Seminar, Dept. of Physics, University of Oregon, Eugene, Oregon, USA (April, 1, 1992).
91. “X-ray Microscopy: Seeing Things in a New Light”, Seminar, Dept. of Physics, North Carolina State University, Raleigh, NC, USA (March, 25, 1992).
92. “C-XANES Imaging and Spectroscopy of Organic Samples”, Seminar, National Synchrotron Light Source, BNL, Upton, USA (Feb. 14, 1992).
93. “Nano-XPS with Synchrotron Radiation”, Workshop on “Putting Synchrotron Radiation to work for Technology: Analytical Methods”, LBL, Berkeley, USA (January 17, 1992).
94. “Spectromicroscopy with Synchrotron Radiation”, Seminar, Dept. of Materials Science, UoW-Madison, Madison, WI, USA (December 10, 1991).
95. “Spectromicroscopy at Beamline X1A at the NSLS”, Seminar, Synchrotron Radiation Center, Stoughton, WI, USA (December 9, 1991).
96. “C-XANES Imaging and Spectroscopy of Polymer Blends”, Seminar, EXXON Research and Engineering, Annandale, NJ, USA (December 3, 1991).
97. **“X-ray Spectromicroscopy”, Colloquium, Dept. of Physics, Brookhaven National Laboratory, NY (November 19, 1991).**
98. **“Soft X-ray Photoemission Microscopy”, Colloquium, Dept. of Physics, Louisiana State University, Baton Rouge, Louisiana (October 31, 1991).**
99. “Scanning Photoemission Microscopy with Synchrotron Radiation”, 7<sup>th</sup> National Conference on Synchrotron Radiation Instrumentation, Baton Rouge, Louisiana (October 31, 1991).
100. “Core-level Photoelectron Imaging”, Seminar, NIST, Gaithersburg, MD (September 23, 1991).

101. "High Resolution Scanning Photoemission Microscopy", Workshop on "Spectroscopic Imaging: Diffraction and Holography with X-ray Photoemission", LBL, Berkeley, CA (August 14, 1991).
102. "Imaging with Photoelectrons at the NSLS", Seminar, AT&T Bell Labs, Holmdel, NJ (July 15, 1991).
103. "Photoemission Microscopy of Alumina Surfaces", 74<sup>th</sup> Canadian Chemical Conference, Hamilton, Ontario, Canada (July 3, 1991).
104. "Improved Spatial Resolution (150 nm) of the X1-SPEM with the Use of Elliptical Zone Plates", Seminar, Sincrotrone Trieste, Trieste, Italy (June 21, 1991).
105. "Deep-submicron Imaging with X-rays at the NSLS", Seminar, European Synchrotron Radiation Facility, Grenoble, France (June 12, 1991).
106. "Scanning Photoemission Microscopy", Workshop on "Imaging with X-rays", Brookhaven National Laboratory, Upton, NY (May 20, 1991).
107. "Undulator Based Scanning Photoemission Microscopy", Seminar, EXXON Research and Engineering, Annandale, NJ (March 11, 1991).
108. "X-ray Microscopy at the NSLS", Seminar, Sincrotrone Trieste, Trieste, Italy (September 17, 1990).
109. "The X1-SPEM, a High Resolution Scanning Photoemission Microscope at the NSLS", Seminar, DESY, Hamburg, FRG (September 14, 1990).
110. "X-ray Microscopy at X1A", NSLS User Meeting, Brookhaven National Laboratory, Upton, NY (May 18, 1990).
111. "The X1-SPEM, a Scanning Photoemission Microscope at X1A", Seminar, NSLS, BNL, NY (March 23, 1990).
112. "X-ray Spectromicroscopy with a Zone Plate Generated Microprobe", Seminar, IBM Yorktown Heights, NY (March 19, 1990).
113. "Micro-XPS at the National Synchrotron Light Source", Symposium für die Planung von BESYII zum Problemkreis Röntgenmikroskopie and Mikroanalytische Elektronenspektroskopie, Göttingen, FRG (June 1988).

## **Publications**

### **Book Review:**

1. "Polymer Microscopy", by Sayers and Grubb, Chapman and Hall, in Trends in Polymer Science, Elsevier Publishing.

### **Invited Review Articles or Invited Book Chapters:**

1. "NEXAFS Spectroscopy and Microscopy of Natural and Synthetic Polymers", H. Ade and S. Urquhart, in *Chemical Applications of Synchrotron Radiation*, T. K. Sham, ed. , World Scientific. (in preparation).
2. "Materials Characterization with X-ray Spectromicroscopy", Reports on Progress in Physics, Institute of Physics Publishing (declined).
3. "X-ray Spectromicroscopy", H. Ade, in *Methods of Vacuum Ultraviolet Physics*, J. A. R. Samson and D. L. Ederer, eds., Academic Press (1998).
4. "Compositional and Orientational Analysis of Polymeric Materials with X-ray Microscopy", Trends in Polymer Science **5**, 58-66 (1997).
5. "Photoemission X-ray Microscopy", International Journal of Modern Physics B (declined).

### **Contributed Book Chapters:**

- 1 "Scanning Spectromicroscopy with 250 to 800 eV X-rays", H. Ade and C. H. Ko, in *Chemical, Structural and Electronic Analysis of Heterogeneous Surfaces on Nanometer Scale*, R Rossei, eds. Kluwer Academic Publishers, Dordrecht (1996).

**Refereed Articles (advanced draft or submitted):**

1. "Quantitative orientational analysis of polymers at high spatial resolution: The lateral orientational order of poly (*p*-phenylene terephthalamide) fibers.", H. Ade, A. P. Smith, A. Garcia, S. Urquhart, Phys. Rev. Lett. (in preparation).
2. "Identification and quantitation of urea precipitates in flexible polyurethanes by NEXAFS microscopy", E.G. Rightor, S. Urquhart, A. Hitchcock, H. Ade, A.P. Smith, G. Mitchell, R. Priester, and W. Lidy, *Macromolecules* (to be submitted) (1999)
3. "Filler Particles in Polyurethanes Studied by Soft X-ray Spectromicroscopy", A.P. Hitchcock, T. Tyliczszak, E.G. Rightor, G.E. Mitchell, M.T. Dineen, W. Lidy, R.D. Priester, S.G. Urquhart, A.P. Smith, and H. Ade, *J. Polym. Sci. B: Polym. Phys.* (to be submitted) (1999)
4. "Isotopic Differentiation in NEXAFS Spectroscopy of Polymers: C 1s NEXAFS of hydrogenated and deuterated Polystyrene and Polybutadiene", S.G. Urquhart, H. Ade, A.P. Smith, and M. Rafailovich, *Chem. Phys. Letter* (submitted) (1999)
5. "Compatibilization of Polymer Blends Produced by Cryogenic Mechanical Alloying", A.P. Smith, H. Ade, C.C. Koch, S.D. Smith, and R.J. Spontak, *Macromol.* (submitted) (1999).
6. "Temperature Induced Morphological Evolution in Polymer Blends Produced by Cryogenic Mechanical Alloying", A.P. Smith, R.J. Spontak, C.C. Koch, S.D. Smith, and H. Ade, *J. Polym. Sci. B: Polym. Phys.* (submitted) (1999).

**Refereed Articles:**

1. "High-energy Mechanical Alloying of Poly(methyl methacrylate) with Polyisoprene or Poly(ethylene-*alt*-propylene) at Cryogenic Temperatures", A.P. Smith, R.J. Spontak, C.M. Balik, C.C. Koch, S.D. Smith, and H. Ade, *Macromol. Mater. Eng.* in press (2000).
2. "High-energy Mechanical Milling of Poly(methyl methacrylate), Polyisoprene and Poly(ethylene-*alt*-propylene)", A.P. Smith, J.S. Shay, R.J. Spontak, C.M. Balik, H. Ade, S.D. Smith, and C.C. Koch, *Polymer* (in press) (1999).
3. "The Effect of an Interactive Surface on the Equilibrium Contact Angle in Bilayer Polymer Films", D. Slep, J. Asselta, M.H. Rafailovich, J. Sokolov, D.A. Winesett, A.P. Smith, H. Ade, and S. Anders, *Langmuir* (in press, 1999).
4. "NEXAFS spectromicroscopy of Polymers: Overview and Quantitative Analysis of Polyurethane Polymers", S.G. Urquhart, A.P. Hitchcock, A. Smith, H.W. Ade, W. Lidy, E.G. Rightor, and G.E. Mitchell, *J. Electron Spectrosc. Relat. Phenom.* **100**, (1999).
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