

## CURRICULUM VITAE

Peder J. Estrup  
Dean of the Graduate School and Research  
Newport Rogers Professor of Chemistry  
Professor of Physics  
Emeritus

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Education: M.Sc. (Chemistry) Royal Polytechnic University  
Copenhagen, Denmark 1954  
Ph.D. (Physical Chemistry) Yale University  
New Haven, Connecticut 1959

### **Brown University Appointments:**

Associate Professor, Physics and Chemistry 1967-70  
Professor of Physics and Chemistry 1970-  
Chairman, Department of Chemistry 1989-96  
Newport Rogers Professor of Chemistry 1992-2004  
Dean of the Graduate School and Research 1996-2003

### **Professional Appointments:**

Lieutenant, Danish Army 1954-56  
Postdoctoral Fellow, European Center for Nuclear Research,  
Switzerland 1959-61  
Research Staff, Bell Laboratories, New Jersey 1961-64  
Group Leader, Bartol Research Foundation, Pennsylvania 1964-67

**Academic Honors:**

Fulbright Scholar 1956-59  
Sheffield Fellow 1958  
CERN Fellow 1959  
Fellow, American Physical Society 1972  
Philips Distinguished Lecturer, Haverford College 1990  
Fellow, Wayland Collegium 1991  
Newport Rogers Chair 1992  
Fellow, American Vacuum Society 1993  
Proctor and Gamble Award, Cincinnati 1995  
Royce Faculty Fellow 1996  
Wilson –Deblois Award 2002  
“The Bernard E. Bruce Award for Inspiring Those Who Follow”-  
Graduate Minority Student Association  
Keynote Speaker at Soro Akademie, Denmark, 2009

**Service to the University:**

Graduate Council, 1979-81  
Advisory Committee, Materials Science Program, 1974-80  
Advisory Committee, Interface Program (Medical Education), 1978-81  
Qualifying and Preliminary Exams Committee (Chairman), 1977  
Undergraduate Curriculum Committee, Physics, 1978-84  
Solid State Seminar Committee, Physics, 1982-83  
Academic Advisory Committee for the Commonwealth Program, 1980-81  
Graduate Curriculum Committee, Chemistry, 1980-82  
Committee on Instructional Laboratories, 1980-85  
Advisory Committee for the Materials Science Program, 1980-82  
Freshman Counselor, 1982-89  
Executive Committee, Materials Science Program, 1983-89  
Graduate Admissions Committee, 1983-84 (Chair)  
Qualifying Exam Committee, 1983-84 (Chair)  
Graduate Admissions Committee, 1984-85 (Physics)  
Qualifying Exam Committee, 1984-85 (Physics)  
Instructional Laboratory Committee, 1984-85 (Physics)  
Physical Chemistry Seminars, 1984-85  
Materials Research Laboratories Executive Committee, 1983-90  
Committee on Nominations, 1983-84  
Committee on Nominations (Chairman), 1984-85  
EPC Subcommittee on Honors Program, 1985  
Physics Instructional Laboratories, 1985  
United Funds Representative, 1985  
Committee on Language Examinations, 1985

Graduate Admissions Committee, 1985  
Physics Faculty Search Committee, 1987 (Chair)  
Qualifying Exam Committee, 1987  
Undergraduate Curriculum Committee, 1987  
Graduate Student Admissions Committee (Chemistry), 1988  
Steering Committee on Electron Microscopes, 1988  
Faculty Research Committee (Chair) (Physics), 1988-89  
Qualifying Exam Committee (Physics), 1988-89  
Provost's Seminar Group, 1989  
Chairman, Department of Chemistry, 1989-96  
Advisory Board, NSF, WISE Program, 1991-94  
Faculty Search Committee, 1991-92 (Chair)  
Steering Committee, Environmental Sciences Concentration, 1991-93  
Dean of the College Search Committee, 1994-95  
Department Chairs' Agenda Committee, 1993  
Wriston Grant Committee, 1995  
Faculty Search Committee (Physics), 1995-96 (Chair)  
Search Committee for Dean of Faculty, 1996  
Search Committee for Vice President of Development, 1998  
Search Committee for Dean of Faculty, 2000  
Faculty Lecturer, Brown Alumni, Scandinavia, 2000

**Service to the Profession:**

Organizing Committee, International Conference on Solid Surfaces, 1971  
Consultant, Naval Research Laboratory, 1975  
Steering Committee, LEED Conference, 1973  
Executive Committee, Surface Science Division of AVS, 1972-75  
Advisory Committee, Conference on "Ordering in Two Dimensions", 1980  
Surface Chemical Physics Working Group, IUPAC, 1978  
Chairman, American Vacuum Society Surface Symposium, 1980  
Chairman, American Physical Society National Meeting, 1981  
Synchrotron Users Conference, Brookhaven, 1981  
National Academy of Science Evaluation Panel for the National Bureau of Standards, 1980-82  
Executive Committee, AVS Surface Science Division, 1982-85  
Department of Energy Peer Review Panel for Basic Sciences, 1984  
Session Chairman, Gordon Research Conference, 1983  
Program Committee, National Surface Symposium, 1983-85

Organizing Chairman, Chem-Phys Symposium, Surface Phase Transitions (APS), 1984-85  
Chairman, Physical Electronics Conference, 1984  
AVS Program Committee, 1984  
Session Chairman, APS Meeting, 1985  
Chair, AVS Surface Symposium, 1988  
Executive Committee, Physical Electronic Conference, 1988-91  
Vice-Chair, Gordon Conference on Surface Dynamics, 1989  
Executive Committee, Physical Electronic Conference, 1989-90  
Organizing Committee, International Thin Film Conference, 1990  
Solid State Sciences Committee, National Academy of Sciences, 1989-92  
NSF External Review Committee, University of Maryland, 1990  
Awards Committee, Langmuir Prize of American Physical Society, 1989-91  
Chairman, Gordon Conference on Surface Dynamics, 1991  
International Steering Committee, Surface Conference, Paris, 1992  
Chairman, Langmuir Prize Awards Committee, 1992  
Advisory Committee, International Conference on Solid Surfaces, Taiwan, 1994  
Steering Committee, Eight International Conference on Solid Films, Japan, 1995-96  
Chairman, Physical Electronics Conference, 1996  
Review Panel, University of Toronto, 1998  
Chair, Graduate Deans Conference, 1999  
National CGS/UMI Distinguished Dissertation Award Committee, 2000  
External Review, Tufts University, 2000-01

**Editorial Work:**

Editor, Surface Phenomena (North-Holland Publ.CO) 1970-78  
Editorial Board, Progress in Surface Science, 1979-90  
Associate Editor, Journal of Vacuum Science, 1986-90  
Associate Editor, Journal of Physical Chemistry, 1990-91  
Senior Editor, Journal of Physical Chemistry, 1991-94  
Editorial Board, Journal of Physical and Chemical Reference Data, 1993-95

Reviewer for numerous scientific journals, including

Nature, Science, Physical Review, Physical Review Letters, Journal of Applied Physics, Review of Scientific Instruments, Journal of Chemical Physics, Surface Science, Langmuir, Journal of the American Chemical Society, Journal of Physical Chemistry.

### **Professional Societies:**

American Physical Society (Fellow)  
American Chemical Society  
Catalysis Society  
American Vacuum Society (Fellow)  
American Association in the Advancement of Science

### **Public Presentations:**

### **Workshops and Special Lectures**

- 1969      Lecturer, NATO Summer Institute, Belgium  
Surface Symposium, Night Vision Lab, Fort Belvoir, Virginia  
Material Science Workshop, Wayne State University,  
Michigan
- 1973      Surface Symposium, Stanford University, California
- 1974      Panel on Surface Physics, Newport Beach, California
- 1975      Chemistry of Surfaces, Brookhaven National Laboratory  
Kendall Symposium, Philadelphia  
ISOLDE Symposium, Denmark
- 1976      Gordon Conference, New Hampshire  
Surface Science Lectures, St. Jean-Sherbrook, Canada
- 1978      Technical University, Denmark  
Orsted Institute, Denmark  
Greater Washington Colloquium, Washington, D.C.
- 1979      International Summer School on Surfaces Science, University of  
Wisconsin (lecturer)
- 1981      Brown Chemistry Alumni Symposium
- 1982      Atomic Research Establishment, Denmark
- 1983      Lecturer, International School on Surface Science, University of  
Wisconsin
- 1985      International Workshop on Hydrogen in Metals, Los Alamos, New  
Mexico
- 1989      Keynote Speaker, State of Pennsylvania Surface Science Workshop
- 1990      Philips Lecturer, Haverford College
- 1991      Keynote Speaker, International Surface Workshop, Cambridge, UK

## Colloquia and Seminars

- 1981      Chemistry Colloquium, M.I.T.  
            Physics Seminar, University of Maryland  
            Chemistry Seminar, Cal Tech
- 1982      Physics Seminar, Yale University  
            Materials Science Seminar, Los Alamos  
            Surface Science Seminar, Sandia Labs, New Mexico  
            Surface Physics Seminar, National Bureau of Standards  
            Physical Seminar, University of Copenhagen
- 1984      Physics Colloquium, University of Chicago  
            Chemistry Colloquium, Oak Ridge National Laboratory  
            Physics Seminar, Georgia Institute of Technology  
            Physics Seminar, Penn Sate University  
            Cornell University
- 1985      University of California, Irvine  
            University of California, San Diego  
            Sandia, Livermore
- 1986      Bell Laboratories, New Jersey  
            Technical University, Denmark  
            ATT Bell Laboratories  
            University of Montreal
- 1987      Brookhaven National Laboratory  
            Harvard University  
            Iowa State University  
            Stanford University
- 1988      Massachusetts Institute of Technology  
            Yale University  
            Wesleyan University  
            University of California
- 1989      Lehigh University  
            IBM Research Laboratories  
            Sandia National Laboratories
- 1990      University of Pennsylvania  
            State University of New York, Stony Brook
- 1991      University of California, Los Angeles  
            Sandia National Laboratories  
            University of California, Berkeley

- 1992 Massachusetts Institute of Technology  
Boston University
- 1993 University of California, Santa Barbara  
Sandia Livermore
- 1994 University of Maryland  
Brookhaven National Laboratory, New York
- 1995 Brandeis University  
University of Cincinnati  
University of Copenhagen, Surface Science Center, Copenhagen,  
Denmark

### **Papers Presented at Professional Meetings**

- 1969 Gordon Research Conference, Invited Paper
- 1970 American Vacuum Society, Invited Paper  
Electrochemical Society, Invited Paper  
Physical Electronics Conference, Session Chairman
- 1971 Metall. Society, Invited Paper  
Physical Electronics Conference
- 1972 American Vacuum Society, Session Chairman  
American Chemical Society, Invited Paper
- 1973 American Physical Society, New York., Invited Paper  
Physical Electronics Conference, Session Chairman
- 1974 American Physical Society  
American Vacuum Society
- 1975 Physical Electronics Conference  
Gordon Research Conference, Invited Paper
- 1976 American Physical Society, Invited Paper  
American Chemical Society, Invited Paper
- 1977 Physical Electronics Conference  
American Vacuum Society
- 1978 Gordon Conference  
American Chemical Society  
AVS Symposium, San Francisco, Invited Paper
- 1979 American Physical Society, Chicago  
American Vacuum Society, New Mexico, Invited Paper  
AVS Symposium, New York  
Gordon Research Conference, Invited Paper
- 1980 American Physical Society, Meeting  
International Conference on Ordering in Two  
Dimensions, Invited Paper  
AVS Surface Symposium, Detroit  
Mat. Research Society Meeting, Boston, Invited Paper

- 1981 AIME Surface Symposium, Chicago, Invited Paper  
International Conference on Surface Phase Transitions,  
Maine, Invited Paper  
American Chemical Society Meeting, New York, Invited Paper  
American Vacuum Society Meeting, Anaheim
- 1982 American Chemical Society Meeting, Nevada, Invited Paper  
International Symposium on the Statistical Mechanics of  
Adsorption, Trieste, Italy, Invited Paper  
American Vacuum Society Meeting, Baltimore
- 1983 American Physical Society, Los Angeles  
American Vacuum Society, Boston, Invited Paper
- 1984 American Physical Society, National Meeting, Invited Paper  
Physical Electronics Conference, Princeton  
American Vacuum Society, National Meeting
- 1985 Hagstrum Surface Symposium, Bell Labs, Invited Paper  
American Physical Society  
Gordon Conference, Gas-surface Dynamics, Invited Paper  
American Crystall. Assoc. Surface Symposium, Invited Paper
- 1986 American Physical Society, Las Vegas  
Physical Electronics Conference, Austin  
Joint US-Canada Conference on Interface Phenomena, Campobello,  
Invited Paper  
American Vacuum Society, Baltimore
- 1987 American Physical Society, New York  
American Chemical Society, Denver, Invited Paper  
Gordon Research Conference  
American Vacuum Society, Anaheim
- 1988 National AVS Surface Symposium, Invited Papers (*with R  
Birgeneau and I.K. Robinson.*)  
American Physical Society, New Orleans, (3 papers)  
Physical Electronics Conference, Brookhaven
- 1989 Gordon Research Conference on Surface Dynamics  
American Vacuum Society, Boston, (2 papers)
- 1990 American Physical Society, Anaheim  
American Chemical Society, Boston  
Physical Electronics Conference, Maryland  
American Chemical Society, Washington D.C.  
American Vacuum Society, Toronto, Canada
- 1991 American Chemical Society, Atlanta, Invited Talk  
Canadian Surface Conference, Montreal  
American Physical Society, Cincinnati  
American Vacuum Society, Seattle
- 1992 American Physical Society, Chicago



- 1993 Physical Electronics Conference, Irvine  
 American Physical Society National Meeting  
 Gordon Research Conference  
 Physical Electronics Conference
- 1994 American Vacuum Society National Meeting  
 American Physical Society National Meeting  
 Physical Electronics Conference  
 American Vacuum Society National Symposium
- 1995 American Chemical Society National Meeting  
 AVS Surface and Interface Symposium  
 Physical Electronics Conference

### Book Reviews:

- “The Chemical Physics of Surfaces”, *Physics Today*, (June 1978).  
 “Topics in Surface Chemistry”, *Science* 204, 943 (1979).  
 “The Theory of Chemisorption”, *J. Am. Chem. Soc.* 103, 5987  
 (1981)

### Publications:

1. “Reactions of Recoil Tritium Atoms”, Ph.D. Thesis, Yale University (1959)
2. “Mechanism of Reaction of Recoil Hydrogen in the Gas Phase”, *J. Phys. Chem.* 62, 1356 (1958), with M. El-Sayed and R. Wolfgang.
3. “The Effect of Moderators on the Reactions of Hot Hydrogen with Methane”, *J. Amer. Chem. Soc.* 82, 2661 (1960), with R. Wolfgang.
4. “Kinetic Theory of Hot Atoms, Application to the System H + CH<sub>4</sub>”, *J. Amer. Chem. Soc.* 82, 2665 (1960), with R. Wolfgang.
5. “A New Isotope: Cadmium-103”, *Nuclear Physics* 18, 624 (1961), with R. Wolfgang.
6. “Spallation Yields from Iron with 24 BeV Protons”, *Geochim. Cosmochim. Acta* 27, 891 (1963).
7. “Energy Degradation of Energetic Atoms and Hot Atom Reactions”, *J. Chem. Phys.* 41, 164 (1964)

8. "Effect of Gaseous Ions and Electrons on a Semiconductor Surface", *IEEE Trans. Nucl. Sci.* 12, 413 (1965).
9. "Studies of Monolayers of Lead and Tin in a Si(III) Surface", *Sci.* 2, 465 (1964), with J. Morrison.
10. "Surface Charge on Silicon Inducted by Ambient Ionization", *Solid State Electr.* 8, 535 (1965).
11. "Approximate Methods in LEED Intensity Calculations", Bell Telephone Labs Tech. Mem. (June 1965), with E. G. McRae.
12. "Structure of Thorium Monolayer on the Tungsten (100) Surface", *Appl. Phys. Letters* 7, 122 (1965), with J. Anderson.
13. "LEEDS Studies of Thorium Adsorption on Tungsten", *Surface Sci.* 4, 286 (1966), with W. Danforth and J. Anderson.
14. "Chemisorption of Hydrogen on Tungsten(100)", *J. Chem. Phys.* 45, 2254 (1966), with J. Anderson.
15. "LEED Studies of the Adsorption System W(100) + N<sub>2</sub> and W(100) + N<sub>2</sub> + CO", *J. Chem. Phys.* 46, 567 (1967), with J. Anderson.
16. "Adsorption of CO on Tungsten(100) Surface", *J. Chem. Phys.* 46, 563 (1967), with J. Anderson.
17. "Characterization of Chemisorption by LEED", *Surface Sci.* 8, 101 (1967), with J. Anderson.
18. "Surface Structures and Work Function Changes in Oxygen Adsorption on Tungsten(100), Rept. 27, Annual Physical Electronics Conference, Cambridge (1967) 47, with J. Anderson.
19. "Thorium Layers on W(100): Structure and LEED Intensities", *Surface Sci.* 7, 255 (1967), with J. Anderson.
20. "Oxygen Adsorption on Tungsten(100)", (abstract) *Bull. Am. Phys. Soc.* 12, 979 (1967).
21. "Problems of Adsorbate Arrangement in the W(1x4)-(N+CO) Structure", *J. Chem. Phys.* 47, 1881 (1967), with J. Anderson.

22. “Effects of Electrons on Ammonia Adsorbed on a Single Crystal Tungsten Surface”, *Surface Sci.* 9, 463 (1968), with J. Anderson.
23. “The Interaction of Oxygen with a Thorium Covered Tungsten Surface”, (AEC Report, NYO-3830, March 1968), with W. Danforth.
24. “The Effect of Temperature on LEED Intensities from Adsorbed Structures”, in *The Structure and Chemistry of Solid Surfaces* (John Wiley and Sons, New York) 1969, 19-1.
25. “Adsorption and Decomposition of NH<sub>3</sub> on a Single-Crystal Tungsten Surface”, *J. Chem. Phys.* 49, 523 (1968), with J. Anderson.
26. “Comments on the Decomposition of Ammonia on a Tungsten Surface”, *J. Chem. Phys.* 51, 475 (1969).
27. “Principles and Applications of Low Energy Electron Diffraction”, in *Diffraction and Techniques in Materials Science* (North Holland, Amsterdam), 1970, 377.
28. “Comments on the Chemisorption of Hydrogen on Molybdenum(100)”, *J. Chem. Phys.* 54, 1845 (1971).
29. “Surface Studies by Electron Diffraction”, *Surface Sci.* 25, 1 (1971), with E. G. McRae.
30. “Interaction of Hydrogen with Mo(100)”, Proc. Sixth LEED Conference (Washington, D.C.), 27 (1971), with C.H. Huang.
31. “Carbon Monoxide Adsorption on Nickel(110)”, *J. Vac. Sci. Tech.* 10, 26 (1973), with T. N. Taylor.
32. “Extreme Broadening of the 4p Level in Fifth Period Elements”, *Bull Am. Phys. Soc.* 19, 233 (1974), with G. B. Fisher and R. Shalvoy.
33. “The Interaction of Hydrogen with Ni(110)”, *J. Vac. Sci. Tech.* 11, 244 (1974), with T. N. Taylor
34. “Hydrogen Adsorption of Mo(100) at Low Temperature”, *Bull. Am. Phys. Soc.* 19, 357 (1974), with C. H. Huang.
35. “The Geometry of Surface Layers”, *Physics Today* 28, 33, April 1975.

36. "Model of beta-CO on Mo(100): Dissertation Adsorption", *Surface Sci.* 54, 179 (1976), with T. Felter.
37. "Improved Method for LEED Intensity Measurements", *Rev. Sci. Instr.* 47, 158 (1976), with T. Felter.
38. "LEED Studies of Surface Layers", in *Characterization of Metal and Polymer Surfaces* (Acad. Press), Vol. 1, 187 (1977)
39. "Phase Transition on Mo(100) and W(100) Surfaces", *Phys. Rev. Lett.* 38, 1138 (1977), with T. Felter and R. A. Barker.
40. "Studies of Electron Stimulated Desorption (ESD) in a LEED System", Applications in *Surface Science* 1, 120 (1977), with T. Felter.
41. "Surface Characterization by Low Energy Electron Diffraction", in *Modern Methods in Materials Science*, North Holland (1978). Vol. 2, 533 (ed. S. Amelinckx et al.)
42. "Hydrogen on Tungsten(100): Adsorbate Induced Surface Reconstruction", *Phys. Rev. Lett.* 41, 1307 (1978), with R. A. Barker.
43. "Adsorption of Carbon Monoxide on the Molybdenum (100) Surface", *Surface Sci.* 76, 464 (1978), with T. E. Felter.
44. "Structural Models of the Reconstructed W(100) Surface", *Solid State Commum.* 25, 375 (1978), with R.A. Barker, F. Jona and P. Marcus.
45. "Kinetics of Thermal Desorption and Thermal Conversion of Adsorbates by Auger Electron Spectroscopy", *J. Vac. Sci. Technol.* 15, 554 (1978), with G. Robertshaw.
46. "Chemisorption and Phase Transition on W(100) and Mo(100)", *J. Vac. Sci. Techol.* 16, 635 (1979).
47. "Atomic Displacement on the Mo(100) and H/Mo(001) Surfaces", *Surface Sci.* 94, L162 (1980), with R. A. Barker and S. Semancik.
48. "Simple DC Method for the Continuous Measurement of Work Function Changes", *J. Vac. Sci. Technol.* 17, 755 (1980), with R. A. Barker, T.E. Felter, and S. Semancik.

49. "Photoemission Method for the Study of Surface Kinetics: CO on Mo(001)", *J. Vac. Sci. Technol.* 17, 233 (1980), with S. Semancik.
50. "Surface-Reflectance Spectroscopy Studies of H on W(110): Surface Band Structure and Adsorbate Geometry", *Phys. Rev. Lett.* 44, 171 (1980), with G. B. Blanchet and P. J. Stiles.
51. "Substrate Rearrangement and 2D Ordering", in *Ordering in Two Dimensions* S. Sinha, ed. Elsevier, p. 39 (1980), with R. A. Barker.
52. "The Kinetics of CO Dissociation on Mo(001)", *Surface Sci.* 104, 26 (1981), with S. Semancik.
53. "SRS Studies of the O/W (110) Phase Diagram", *J. Vac. Sci. Technol.* 18, 502 (1981), with G.B. Blanchett and P.J. Stiles.
54. "Surface Structures and Phase Diagram for the H/W(001) Chemisorption System", *J. Chem. Phys.* 74, 1442 (1981), with R. A. Barker.
55. "Surface Rearrangement of Adsorbate-Covered Mo(001)", *J. Vac. Sci. Technol.* 18, 541 (1981), with S. Semancik.
56. "A Study of the H/W (110) Adsorption System by Surface Reflectance Spectroscopy", *Phys. Rev.* B23, 3655 (1981), with G. B. Blanchet and P.J. Stiles.
57. "Co-Adsorbed Phases of Hydrogen and Oxygen on W(001)", *J. Vac. Sci. Technol.* 18, 546 (1981).
58. "Desorption Kinetics and Surface Restructuring for H/W(001)", *J. Vac. Sci. Technol.* 20, 536 (1982), with R.A. Barker and A.M. Horlacher.
59. "Compatibility of FIM and LEED Observations for the W(100) Reconstruction", *Surface Sci.* 123, L703 (1982), with L.D. Roelofs and S.C. Ying.
60. "Two-Dimensional Phases in Chemisorption Systems", *Surface Sci.*, 125, 51 (1983), with L. D. Roelofs.
61. "Desorption of Hydrogen from Tungsten(100)", *Surface Sci.* 136, 327 (1984), with A. M. Horlacher.

62. "Influence of Surface Phase Transition on Desorption Kinetics: The Compensation Effect", *J. Phys. Chem.*, 90, 4099 (1986), with E. F. Greene, M. Cardillo, and J. Tully.
63. "Interaction of Hydrogen and Oxygen on Tungsten(100)", *J. Vac. Sci. Technol.*, A2, 877 (1984), with A. M. Horlacher.
64. "Reconstruction of Metal Surfaces", *Chemistry and Physics of Solid Surfaces*, 5, 205 (1984): Springer Series in Chemical Physics, No. 35 (R. Vanselow and R. Howe, ed.) Springer, Berlin, 1984.
65. "The Kinetics of CO Dissociation on Mo(110) and Effects of Co-adsorbates", *J. Vac. Sci. Technol.*, A3, 1479 (1985), with J. W. Erickson.
66. "Effect of Adsorbate Binding Sites on Adsorbate Phase Diagrams: O/W(100)", *Phys. Rev.*, B33, 6537 (1986), with L.D. Roelefs, J. W. Chung and S.C. Ying.
67. "The Dissociation of CO on Modified Mo(110) Surfaces", with J.W. Erickson, *Surface Sci.*, 167, 519 (1986).
68. "Reconstruction of the W(110) Surface Induced by Hydrogen Adsorption", *Phys. Rev. Lett.*, 56, 749 (1986), with J.W. Chung and S.C. Ying.
69. "Reconstruction, Adsorbate Bonding, and Desorption Kinetics of H/Mo(100)", *J. Vac. Sci. Technol. A5*, 791 (1987), with J. A. Prybyla and Y. J. Chabal.
70. "Reconstructive Phase Transitions and Effective Adsorbate Interactions: H-Mo(100) and H/W(100)", *Phys. Rev. Lett.* 58, 1877 (1987), with J.A. Prybyla, S.C. Ying, and Y.J. Chabal.
71. "Phase Transformations of the H/W(110) and H/Mo(110) Surfaces", *J. Vac. Sci. Technol. A5*, 1045 (1987), with M. Altman, J.W. Chung, J. M. Kosterlitz, J. Prybyla, D. Sahu, and S.C. Ying.
72. "Grazing-Incidence X-ray Study of the Structures and Phase Transition of Hydrogen on Tungsten(100)", *Phys. Rev. Lett.* 59, 2192 (1987), with J.W. Chung, K. Evans-Lutterodt, E.D. Specht, A.R. Kortan, and R.J. Birgeneau.
73. "Hydrogen-Induced Reconstruction on W(100) and Mo(100) by Surface Infrared Spectroscopy", *J. Electron Spectr.* 44, 17 (1987), with Y.J. Chabal, S.B. Christman, J.J. Arrecis, and J.A. Prybyla.

74. "Second Layer Displacements in the Clean Reconstructed W(100) Surface", *Structure of Surfaces II*, Springer Series in Surface Science, (J.F. VanderVeen, ed.) Springer, Berlin 1988, with I.K. Robinson and M.S. Altman.
75. "Multilayer Reconstruction of the W(001) Surface", *Phys. Rev. B* **38**, 5211 (1988), with M.S. Altman and I.K. Robinson.
76. "X-Ray Diffraction Determination of Multilayer W(001) Reconstruction", *J. Vac. Sci. Technol. A* **6**, 630 (1988), with M. Altman and I.K. Robinson.
77. "The Discrepancy Between Helium and Electron/X-Ray Diffraction from the W(001) Surface", *Surface Science*, **215**, L297 (1989), with I.K. Robinson and J.C. Tully.
78. "Order-Disorder Transitions of the W(001) Surface", *Phys. Rev. Lett.*, **62**, 1294 (1989), with M.S. Altman, I.K. Robinson, A.A. MacDowell, K. Evans-Lutterodt, J. Brock and R. J. Birgeneau.
79. "X-Ray Diffraction From W(100) – With and Without Hydrogen", *J. Vac. Sci. Technol.*, **A7**, 2209 (1989), with M.S. Altman, R.J. Birgeneau, et al.
80. "Hydrogen on Transition Metals", in *The Chemical Physics of Solid Surfaces and Heterogeneous Catalysis*, Vol. 3A, p. 1-38 (1990), with J. Davenport.
81. "Desorption from Co-existing Surface Phases: H/Mo(100)", *J. Vac. Sci. Technol.*, **A8**, 2468 (1990), with J.A. Meyer and G. Lopinski.
82. "Phase Transitions, Surface Structures and Adsorbate Bonding in the H/Mo(100) Chemisorption System", *J. Chem. Phys.*, **94**, 6274 (1991), with J.A. Prybyla and Y.J. Chabal.
83. "Analysis of Stray Capacitance in the Kelvin Method", *Rev. Sci. Instr.*, **62**, 725 (1991), with I.D. Baikie, E. Venderbosch and J.A. Meyer.
84. "Atomic Structure of the High Temperature W(001)-O(2x1) Surface", *Phys. Rev.*, **B44**, (1991), with J.A. Meyer, Y. Kuk and P.J. Silverman.
85. "Ion Scattering Study of the Reconstruction of Mo(100)", *J. Vac. Sci. Technol.*, **A9**, 1604 (1991), with M.L. Hildner, T.E. Felter and R.S. Daley.

86. "Noise and the Kelvin Method", *Rev. Sci. Instrum.*, 62, 1326 (1991), with I.D. Baikie, S. Mackenzie, and J.A. Meyer.
87. "Desorption of Hydrogen from W(110)", *Surface Sci.* (to be published), with J.W. Chung.
88. "Phase Diagram of the O/W(001) System", *Surface Sci.* (to be published), with J.W. Chung and T. Ala-Nissila.
89. "The Effect of Surface Reconstruction on Desorption: H/Mo(100)", *Surface Sci.*, 290, 413 (1993), with J.A. Prybyla
90. "Structural Changes in the Mo(100) Reconstruction", *Phys. Rev. Lett.*, 70, 1295 (1993), with M.L. Hildner, T.E. Felter, and R.S. Daley.
91. "The O/Mo(100) Chemisorption System Studied with EELS", *Surface Sci.*, with J.A. Meyer, (to be published).
92. "Hydrogen Adsorption on Mo(211): Reconstruction and Binding Site Conversion", *Surface Sci.*, 296, 9, (1993), with G. Lopinski and J.A. Prybyla.
93. "Desorption Kinetics of H/Mo(211)", *Surface Sci.*, 315, 269 (1994), with G. Lopinski..
94. "Atomic Displacements of Mo(100) Surface Phases Measured by Ion Scattering", *Physical Review*, B52, 9050 (1995), with M.L. Hildner, R.S. Daley and T.E. Felter.
95. "Surface Phases of Reconstructed Tungsten(100) and Molybdenum(100)", *Surface Sci.*, 299/300, 722 (1994).
96. "Metal Surface Construction", *CRC Handbook of Surface Imaging and Visualization*, A. Hubbard (ed), 407 (1995), with P.A. Thiel.
97. "Studies of Ultrafast Surface Dynamics by Pump-Probe Low Energy Electron Diffraction", *SPIE 2521/113* (1995), with J.R. Thompson and P.M. Weber.
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