

# HARRY JOSEPH PLOEHN

Department of Chemical Engineering, University of South Carolina  
Horizon I Building, Room 239, Columbia, SC 29208  
803-777-7307 (office) • ploehn@mailbox.sc.edu • 803-446-0232 (mobile)  
www.che.sc.edu/faculty/ploehn

## EDUCATION

Ph.D. in Chemical Engineering, Princeton University, 10/88 (advisor: William B. Russel)  
M.A. in Chemical Engineering, Princeton University, 6/84  
B.S. in Chemical Engineering (magna cum laude), Rice University, 5/83

## PROFESSIONAL EMPLOYMENT

8/02 - present Professor, Department of Chemical Engineering, University of South Carolina

- Undergraduate Director, 1/13 - 5/14
- Graduate Director, 8/96 – 7/00 & 6/04 - 8/07
- Associate Department Chair, 6/04 - 9/06
- Interim Department Chair, 7/06 - 9/06

5/14 - 5/16 Vice Provost and Director of Academic Planning, University of South Carolina  
8/09 - 12/10 Interim Dean, College of Engineering & Computing, University of South Carolina  
8/07 - 8/09 Associate Dean for Research and Graduate Studies  
College of Engineering & Computing, University of South Carolina  
6/01 - 7/07 Associate Director (Engineering) & Leader of Catalysis Thrust Area, USC NanoCenter  
8/96 - 7/02 Associate Professor, Chemical Engineering, University of South Carolina  
1/95 - 7/96 Assistant Professor, Chemical Engineering, University of South Carolina  
1/90 - 12/94 Assistant Professor, Chemical Engineering, Texas A&M University  
10/88 - 12/89 Post-Doctoral Researcher, Dept. of Physical Chemistry, Univ. of Bristol, Bristol, UK.  
5/83 - 8/83 Engineering Intern, Dow Chemical Co.  
5/82 - 8/82 Engineering Intern, Dow Chemical Co.

## HONORS, AWARDS, AND DISTINCTIONS

Fellow, American Institute of Chemical Engineers, 2016

### Teaching

Samuel Litman Distinguished Professor Award, USC College of Engineering & Information Technology, 2000  
Michael J. Mungo Teaching Award, University of South Carolina, 1999  
Distinguished Teaching Award, Texas A&M University Association of Former Students, 1994-95  
Center for Teaching Excellence Scholar, Texas A&M University, 1992-93  
Dow Excellence in Teaching Award, Texas A&M Department of Chemical Engineering, 1990-91

### Research and Scholarship

College of Engineering and Information Technology Research Achievement Award, May 2000  
National Science Foundation Young Investigator Award, 1992-97  
Du Pont Young Faculty Award, 1993-94  
Outstanding Paper Award, American Institute of Chemical Engineers Spring National Meeting, March 1993  
Du Pont Young Faculty Award, Texas A&M University, 1992-93  
Phi Beta Kappa  
Tau Beta Pi (President, Texas Gamma Chapter, 1983)  
Phi Lambda Upsilon, Omega Chi Epsilon

### Professional Development

UIDP Corporate Engagement Bootcamp, December 2015  
LEAD Supervisory Essentials Certificate (Management Development Program), February 2015  
SEC Academic Leadership Development Program, 2008-09 Fellow

## PROFESSIONAL AFFILIATIONS

American Institute of Chemical Engineers  
American Society for Engineering Education  
American Chemical Society  
International Association of Colloid and Interface Scientists

## TEACHING RESPONSIBILITIES (COURSE, LEVEL, MOST RECENT SEMESTER)

ENGR 101	Introduction to Engineering	Freshmen	Fall 1998
ECHE 320	Fluid Mechanics	Juniors	Fall 2012
ECHE 321	Heat Flow Analysis	Juniors	Spring 2014
ECHE 720	Advanced Fluid Flow Analysis	Graduate	Fall 2008
ECHE 722	Advanced Mass Transfer	Graduate	Spring 2007
ECHE 789	Interfacial Engineering	Graduate	Fall 2006

Student teaching evaluation data are appended.

## RESEARCH INTERESTS AND ACCOMPLISHMENTS

Interests: Structure-property-processing-performance relationships in nanoscopic, colloidal, and polymeric materials; interfacial phenomena; continuum mechanics modeling of transport phenomena.

- Peer-Reviewed Publications: 91
- Patents: 4 (U.S.)
- Technical Presentations: 149 (37 invited presentations & seminars, 112 contributed)
- Post-Doctoral Researchers: 11
- Doctoral Students: 18
- Master of Science Students: 8
- Undergraduate Researchers: 50
- Externally-Funded Research Grants: 29 (\$9.8M), including 18 as PI (\$4.6M)
- HJP Group Research Expenditures: \$4.6M (\$3,908K external, \$698K institutional/center)

## PEER-REVIEWED PUBLICATIONS

91. "Interlayer Functionalization of Magadiite with Sulfur-Containing Organosilanes", Shigeng Li, Yating Mao, and Harry J. Ploehn\*, *Colloids and Surfaces A: Physicochemical and Engineering Aspects* **506**, 320-330 (2016). DOI: 10.1016/j.colsurfa.2016.06.043
90. "Bimodal Polymer-Brush Core-Shell Barium Titanate Nanoparticles: A Strategy for High-Permittivity Polymer Nanocomposites", Yali Qiao, Xiaodong Yin, Lei Wang, Md. Sayful Islam, Brian Benicewicz, Harry J. Ploehn, and Chuanbing Tang\*, *Macromolecules* **48**(24), 8998-9006 (2015). DOI: 10.1021/acs.macromol.5b02018
89. "High Temperature Creep Behavior of Phosphoric Acid-Polybenzimidazole Gel Membranes", Xiaoming Chen, Guoqing Qian, Max A. Molle, Brian C. Benicewicz, and Harry J. Ploehn\*, *Journal of Polymer Science, Part B: Polymer Physics* **53**, 1527-1538 (2015). DOI: 10.1002/polb.23791
88. "Surface Functionalization of Nanodiamond by Phenylphosphonate", Zahidul Wahab, Elizabeth A. Foley, Perry J. Pellechia, Bruce L. Anneaux, and Harry J. Ploehn\*, *Journal of Colloid and Interface Science* **450**, 301-309 (2015). DOI: 10.1016/j.jcis.2015.03.021
87. "Oligothiophene-Containing Polymer Brushes by ROMP and RAFT: Synthesis, Characterization and Dielectric Properties", Yali Qiao, Md. Sayful Islam, Xiaodong Yin, Kuo Han, Yi Yan, Jiuyang Zhang, Qing Wang, Harry J. Ploehn, and Chuanbing Tang\*, *Polymer* **72**, 428-435 (2015). DOI: 10.1016/j.polymer.2015.02.011
86. "Terthiophene-Containing Copolymers and Homopolymer Blends as High Performance Dielectric Materials", Md. Sayful Islam, Yali Qiao, Chuanbing Tang, and Harry J. Ploehn\*, *ACS Applied Materials & Interfaces* **7**, 1967-1977 (2015). DOI: 10.1021/am507751m
85. "Effect of Interfacial Pretreatment on the Properties of Montmorillonite/Poly(vinyl alcohol) Nanocomposites", Shailesh Shori, Xiaoming Chen, Michael A. Peralta, Hongsheng Gao, Hans-Conrad zur

- Loye, and Harry J. Ploehn\*, *Journal of Applied Polymer Science* **132**(18), 41867 (12 pp) (2015). DOI: 10.1002/app.41867.
84. "High Polymer Content 2,5-Pyridine-Polybenzimidazole Copolymer Membranes with Improved Compressive Properties", Max Molle, Xiaoming Chen, Harry J. Ploehn, and Brian C. Benicewicz\*, *Fuel Cells* **15**, 150-159 (2015). DOI: 10.1002/fuce.201400129
  83. "Covalent Grafting of Phenylphosphonate on Calcium Niobate Platelets", Shailesh Shori, Perry J. Pellechia, Hans-Conrad zur Loye, and Harry J. Ploehn\*, *Journal of Colloid and Interface Science* **437**, 97-110 (2015). DOI: 10.1016/j.jcis.2014.09.024
  82. "Dielectric Properties and Energy Storage Performance of CCTO/Polycarbonate Composites: Influence of CCTO Synthesis Route", Md. Sayful Islam, W. Michael Chance, Hans-Conrad zur Loye, and Harry J. Ploehn\*, *Journal of Sol-Gel Science and Technology* **73**(1), 22-31 (2015). DOI: 10.1007/s10971-014-3490-6
  81. "Thiophene Polymer-Grafted Barium Titanate Nanoparticles toward Nanodielectric Composites", Yali Qiao, Md. Sayful Islam, Lei Wang, Yi Yan, Jiuyang Zhang, Brian C. Benicewicz, Harry J. Ploehn, Chuanbing Tang\*, *Chemistry of Materials* **26**, 5319-5326 (2014). DOI: 10.1021/cm502341n
  80. "Tuning Underwater Oleophobicity of Graphene Oxide Coatings via UV Irradiation", Hang Li, Yi Huang, Yating Mao, Weiwei Xu, Harry J. Ploehn, and Miao Yu\*, *Chemical Communications* **50**, 9849-9851 (2014). DOI: 10.1039/C4CC03940H.
  79. "Sustainable Thermoplastic Elastomers Derived from Renewable Cellulose, Rosin and Fatty Acids", Yupeng Liu, Kejian Yao,\* Xiaoming Chen, Jifu Wang, Zhongkai Wang, Harry J. Ploehn, Chunpeng Wang, Fuxiang Chu,\* and Chuanbing Tang\*, *Polymer Chemistry* **5**, 3170-3181 (2014). Featured on inside front cover. DOI: 10.1039/C3PY01260C
  78. "High Polymer Content 3,5-Pyridine-Polybenzimidazole Copolymer Membranes with Improved Compressive Properties", Max Molle, Xiaoming Chen, Harry Ploehn, Brian Benicewicz\*, *Fuel Cells* **14**, 16-25 (2014). DOI: 10.1002/fuce.201300202
  77. "Montmorillonite-Levan Nanocomposites with Improved Thermal and Mechanical Properties", Xiaoming Chen, Hongsheng Gao, and Harry J. Ploehn\*, *Carbohydrate Polymers* **101**, 565-573 (2014). DOI: 10.1016/j.carbpol.2013.09.073
  76. "Ultrathin, Molecular-Sieving Graphene Oxide Membranes for Highly Selective Hydrogen Separation", H. Li, Z. Song, X. Zhang, S. Li, Y. Mao, H. J. Ploehn, Y. Bao, and M. Yu\*, *Science* **342**(6154), 95-98 (2013). DOI: 10.1126/science.1236686
  75. "Polymers Containing Highly Polarizable Conjugated Side Chains as High-Performance All-Organic Nanodielectric Materials", Y. Qiao, Md. S. Islam, K. Han, E. Leonhardt, J. Zhang, Q. Wang, H. J. Ploehn, and C. Tang\*, *Advanced Functional Materials* **23**(45) 5638-5646 (2013). DOI: 10.1002/adfm.201300736
  74. "Converting an Electrical Insulator into a Dielectric Capacitor: End-Capping Polystyrene with Oligoaniline", C. Hardy, Md. S. Islam, D. Gonzalez-Delozier, J. Morgan, B. Cash, C. Ryu, B. Benicewicz, H. J. Ploehn\*, and C. Tang\*, *Chemistry of Materials* **25**, 799-807 (2013). DOI: 10.1021/cm304057f
  73. "Quantitative Analysis of Exfoliation and Aspect Ratio of Calcium Niobate Platelets", Hongsheng Gao, Shailesh Shori, Xiaoming Chen, Hans-Conrad zur Loye, and Harry J. Ploehn\*, *Journal of Colloid and Interface Science* **392**, 226-236 (2013). DOI: 10.1016/j.jcis.2012.09.079
  72. "Effect of Magnetization on Gel Structure and Protein Electrophoresis in Polyacrylamide Hydrogel Nanocomposites", Jeffery W. Thompson, Holly A. Stretz\*, Pedro E. Arce, Hongsheng Gao, Harry J. Ploehn, and Jibao He, *Journal of Applied Polymer Science* **126**, 1600-1612 (2012).
  71. "Thermal, Mechanical, and Barrier Properties of Polyethylene Terephthalate-Platelet Nanocomposites Prepared by *in situ* Polymerization", Shigeng Li, Kausick Auddy, Peter Barber, Tara J. Hansen, Jisheng Ma, Hans-Conrad zur Loye, and Harry J. Ploehn\*, *Polymer Engineering and Science* **52**(9), 1888-1902 (2012).
  70. "Oligoaniline-Containing Supramolecular Block Copolymer Nanodielectric Materials", Christopher G. Hardy, Md. Sayful Islam, Dioni Gonzalez-Delozier, Harry J. Ploehn,\* and Chuanbing Tang\*, *Macromolecular Rapid Communications* **33**(9), 791-797 (2012).
  69. "Combining Renewable Gum Rosin and Lignin: Towards Hydrophobic Polymer Composites by Controlled Polymerization", Jifu Wang, Kejian Yao, Andrew L. Korich, Shigeng Li, Shuguo Ma, Harry J. Ploehn, Peter M. Iovine, Chunpeng Wang, Fuxiang Chu, Chuanbing Tang, *Journal of Polymer Science Part A: Polymer Chemistry* **49**(17), 3728-3738 (2011).

68. "High Dielectric Polymer Composite Materials from a Series of Mixed Metal Phenylphosphonates, ATi(C<sub>6</sub>H<sub>5</sub>PO<sub>3</sub>)<sub>3</sub> for Dielectric Energy Storage", Peter Barber, Perry J. Pellechia, Harry J. Ploehn,\* and H.-C. zur Loye\*, *ACS Applied Materials & Interfaces* **2**, 2553-2559 (2010).
67. "Biodegradable Nanocomposite Magnetite Stent for Implant-Assisted Magnetic Drug Targeting", Jan O. Mangual, Shigeng Li, Harry J. Ploehn, Armin D. Ebner and James A. Ritter\*, *Journal of Magnetism and Magnetic Materials* **322**, 3094-3100 (2010).
66. "Quantitative Analysis of Pt-PAMAM Ligand Exchange Reactions: Time and Concentration Effects", Y. Gu, P. Sanders, and H. J. Ploehn, *Colloids and Surfaces A: Physicochemical and Engineering Aspects* **356**, 10-15 (2010).
65. "PAMAM-Stabilized Pt-Ru Nanoparticles for Methanol Electro-oxidation", Y. Gu, G. Wu, X.-F. Hu, D. A. Chen, T. Hansen, H.-C. zur Loye, and H. J. Ploehn, *Journal of Power Sources* **195**, 424-435 (2010).
64. "Polymer Composite and Nanocomposite Dielectric Materials for Pulse Power Energy Storage", P. Barber, S. Balasubramanian, Y. Anguchamy, S. Gong, A. Wibowo, H. Gao, H. J. Ploehn, and H.-C. zur Loye, *Materials* **2** 1697-1733 (2009).
63. "Limb Bud Mesenchyme Cultured Under Tensile Strain Remodel Collagen Type I Tubes to Produce Cartilage-Like Tissue", J. Amos, S. Li, M. J. Yost, H. J. Ploehn, J. D. Potts, *Biorheology* **46** (6), 439-450 (2009).
62. "New Layered Mixed Metal Phosphonates for High Dielectric-Polymer Composite Materials", P. Barber, H. Houghton, S. Balasubramanian, Y.K. Anguchamy, H.J. Ploehn, and H.-C. zur Loye, *Chemistry of Materials* **21**, 1303-1310 (2009).
61. "Pt/Glassy Carbon Model Catalysts Prepared from PS-b-P2VP Micellar Templates", Y. Gu, J. St-Pierre, and H.J. Ploehn, *Langmuir* **24**, 12680-12689 (2008).
60. "Hydrodechlorination of 1,2-Dichloroethane Catalyzed by Dendrimer-Derived Pt-Cu/SiO<sub>2</sub> Catalysts", H. Xie, J. Y. Howe, V. Schwartz, J. R. Monnier, C. T. Williams, and H. J. Ploehn, *Journal of Catalysis* **259**, 111-122 (2008).
59. "EXAFS Characterization of Dendrimer-Derived Pt/ $\gamma$ -Al<sub>2</sub>O<sub>3</sub>", A. Siani, O.S. Alexeev, C.T. Williams, H.J. Ploehn and M.D. Amiridis, *AIP Conference Proceedings*, **882**, 737-739, (2007).
58. "EXAFS Characterization of Dendrimer-Pt Nanocomposites Used for the Preparation of Pt/Al<sub>2</sub>O<sub>3</sub> Catalysts", O. S. Alexeev, A. Siani, G. Lafaye, C. T. Williams, H. J. Ploehn, and M. D. Amiridis, *Journal of Physical Chemistry B* **110**, 24903-24914 (2006).
57. "Quantitative Analysis of Montmorillonite Platelet Size by Atomic Force Microscopy", H. J. Ploehn and C. Liu, *Industrial & Engineering Chemistry Research* **45**, 7025-7034 (2006).
56. "Vapor-Assisted Remodeling of Thin Gold Films", Y. Luo, J. Ruff, R. Ray, Y. Gu, H. J. Ploehn, and W. A. Scrivens, *Chemistry of Materials* **17**(20), 5014-5023 (2005).
55. "Dendrimer-Mediated Synthesis of Platinum Nanoparticles: New Insights from Dialysis and AFM Measurements", H. Xie, Y. Gu, and H. J. Ploehn, *Nanotechnology* **16**(7) S492-S501 (2005).
54. "Thermal Decomposition of Generation-4 Polyamidoamine Dendrimers Films: Decomposition Catalyzed by Dendrimer-Encapsulated Pt Particles", O. Ozturk, T. J. Black, K. Perrine, K. Pizzolato, C. T. Williams, F.W. Parsons, J. S. Ratliff, J. Gao, C. J. Murphy, H. Xie, H. J. Ploehn, and D. A. Chen, *Langmuir* **21**(9), 3998-4006 (2005).
53. "AFM Characterization of Dendrimer-Stabilized Platinum Nanoparticles", Y. Gu, H. Xie, J. Gao, D. Liu, C. T. Williams, C. J. Murphy, and H. J. Ploehn, *Langmuir* **21**(7), 3122-3131 (2005).
52. "Electrophoretic Analysis and Purification of Fluorescent Single-walled Carbon Nanotube Fragments", X. Xu, R. Ray, Y. Gu, H. J. Ploehn, L. Gearheart, K. Raker, and W. A. Scrivens, *Journal of the American Chemical Society* **126**(40), 12736-12737 (2004).
51. "Solvent Diffusion Model for Aging of Lithium-Ion Cells", H. J. Ploehn, R. Premanand, and R. E. White, *Journal of the Electrochemical Society* **151**(3), A456-A462 (2004).
50. "Platinum Ion Uptake by Dendrimers: An NMR and AFM Study", P. J. Pellechia, J. Gao, Y. Gu, H.J. Ploehn, and C. J. Murphy, *Inorganic Chemistry* **43**(4), 1421-1428 (2004).
49. "Magnetic Field Orientation and Spatial Effects on the Retention of Paramagnetic Nanoparticles with Magnetite", A. D. Ebner, H. J. Ploehn, and J. A. Ritter, *Separation Science and Technology* **37**(16), 3727-3753 (2002).
48. "Simplified Point Defect Model for Growth of Anodic Passive Films on Iron", B. Krishnamurthy, R. E. White, and H. J. Ploehn, *Electrochimica Acta* **47**(20), 3375-3381 (2002).

47. "Phase Behavior and Microdomain Structure in Perfluorosulfonated Ionomers Via Self Consistent Field Theory", J. J. Krueger, P. P. Simon, and H. J. Ploehn, *Macromolecules* **35**(14), 5630-5639 (2002).
46. "Modeling the Effects of Ion Association on the Alternating Current Impedance of Solid Polymer Electrolytes", C. Lin, R. E. White, and H. J. Ploehn, *Journal of the Electrochemical Society* **149**(7), E242-E251 (2002).
45. "Electric Field Strength Effects on Time-Dependent Passivation of Metal Surfaces", B. Krishnamurthy, R. E. White, and H. J. Ploehn, *Electrochimica Acta* **47**(15) 2505-2513 (2002).
44. "Free Energy Balance for Compression of Polymer Interphases", H. J. Ploehn, *Macromolecules* **35**(13), 5331-5333 (2002).
43. "Modeling the Effects of Electrode Composition and Pore Structure on the Performance of Electrochemical Capacitors", C. Lin, B. N. Popov, and H. J. Ploehn, *Journal of the Electrochemical Society* **149** (2), A167-A175 (2002).
42. "Oligonucleotide Adsorption to Gold Nanoparticles: A Surface-Enhanced Raman Spectroscopy Study of Intrinsically Bent DNA", L. A. Gearheart, H. J. Ploehn, and C. J. Murphy, *Journal of Physical Chemistry B* **105** (50), 12609-12615 (2001).
41. "Non-Equilibrium Point Defect Model for Time-Dependent Passivation of Metal Surfaces", B. Krishnamurthy, R. E. White, and H. J. Ploehn, *Electrochimica Acta* **46**(22), 3387-3396 (2001).
40. "Modeling Mass Transfer and Interfacial Reactions in Three Liquid Phase Transfer Catalysis", J. J. Krueger, M. D. Amiridis, and H. J. Ploehn, *Industrial and Engineering Chemistry Research* **40**(14), 3158-3163 (2001).
39. "Design and Construction of a Uniaxial Cell Stretcher", M. J. Yost, D. Simpson, K. Wrona, S. Ridley, H. J. Ploehn, T. K. Borg, and L. Terracio, *American Journal of Physiology* **279**, 3124-3130 (2000).
38. "Shrinking Core Model for the Discharge of Metal Hydride Electrodes", V. R. Subramanian, H. J. Ploehn, and R. E. White, *Journal of the Electrochemical Society* **147**, 2868-2873 (2000).
37. "Magnetic Hetero-Flocculation of Paramagnetic Colloidal Particles", A. D. Ebner, J. A. Ritter, and H. J. Ploehn, *Journal of Colloid and Interface Science* **225**, 39-46 (2000).
36. "Aggregation Kinetics of Dendrimer-Stabilized CdS Nanoclusters", L. H. Hanus, K. Sooklal, C. J. Murphy, and H. J. Ploehn, *Langmuir* **16**(6), 2621-2626 (2000).
35. "Modeling the Effects of Ion Association on Direct Current Polarization of Solid Polymer Electrolytes", C. Lin, R. E. White, and H. J. Ploehn, *Journal of the Electrochemical Society* **147**(3) 936-944 (2000).
34. "Modeling the Effect of Plasticizer on the Viscoelastic Response of Crosslinked Polymers Using the Tube-Junction Model", P. P. Simon and H. J. Ploehn, *Journal of Rheology* **44**, 169-183 (2000).
33. "Polyamine-Quantum Dot Nanocomposites: Linear versus Starburst Stabilizer Architectures", J. Huang, K. Sooklal, C. J. Murphy, and H. J. Ploehn, *Chemistry of Materials* **11**, 3595-3601 (1999).
32. "Inorganic Quantum Dot – Organic Dendrimer Nanocomposite Materials", K. Sooklal, J. Huang, C. J. Murphy, L. Hanus, and H. J. Ploehn, *Material Research Society Symposium Proceedings* **576**, 439-444 (1999).
31. "Characterizing Colloidal Materials Using DLS", L. H. Hanus and H. J. Ploehn, in *Surface Characterization Methods: Principles, Techniques, and Applications* (A. J. Milling, ed.), pp. 199-249, Marcel Dekker (New York), 1999.
30. "Two-Particle Magnetic Hetero-Flocculation Model for Nanolevel High Gradient Magnetic Separation", A. D. Ebner, J. A. Ritter, and H. J. Ploehn, in *Metal Separation Technologies Beyond 2000: Integrating Novel Chemistry with Processing* (K. C. Liddell and D. J. Chaiko, eds.), pp. 193-204, The Minerals, Metals, and Materials Society (Warrendale, PA), 1999.
29. "New Magnetic Field-Enhanced Process for the Treatment of Aqueous Wastes", A. D. Ebner, J. A. Ritter, H. J. Ploehn, R. L. Kochen, and J. D. Navratil, *Separation Science and Technology* **34**(6&7), 1277-1300 (1999).
28. "Conversion of Intensity-Averaged Photon Correlation Spectroscopy Measurements to Number-Averaged Particle Size Distributions. 1. Theoretical Development", L. H. Hanus and H. J. Ploehn, *Langmuir* **15**(9), 3091-3100 (1999).
27. "Investigating Time-Temperature Superpositioning in Crosslinked Polymers Using the Tube-Junction Model", P. P. Simon and H. J. Ploehn, *Journal of Polymer Science, Part B: Polymer Physics* **37**, 127-142 (1999).
26. "A Blue-Emitting CdS-Dendrimer Nanocomposite", K. Sookal, L. H. Hanus, H. J. Ploehn, and C. J. Murphy, *Advanced Materials* **10**, 1083-1087 (1998).

25. "Backfolding Corrections for Freely Jointed Chains in Self Consistent Field Lattice Models", P. P. Simon and H. J. Ploehn, *Macromolecules* **31**(17), 5880-5891 (1998).
24. "Measurement of Thin Liquid Film Drainage Using a Novel High-Speed Impedance Analyzer", K. O. Hool, R. C. Saunders, and H. J. Ploehn, *Review of Scientific Instruments* **69**, 3232-3239 (1998).
23. "The Effect of Particle Size on the Discharge Performance of a Nickel-Metal Hydride Cell", J. M. Heikonen, H. J. Ploehn, and R. E. White, *Journal of the Electrochemical Society* **145**, 1840-1848 (1998).
22. "Desorption of Adsorbed Poly(ethylene oxide) from Colloidal Polystyrene Particles", J. A. Kling and H. J. Ploehn, *Journal of Colloid and Interface Science* **198**, 241-248 (1998).
21. "Feasibility and Limitations of Nanolevel High Gradient Magnetic Separation", A. D. Ebner, J. A. Ritter, and H. J. Ploehn, *Separation and Purification Technology* **11**, 199-210 (1997).
20. "Effects of Time and Compression on the Interactions of Adsorbed Polystyrene Layers in a Good Solvent", M. Ruths, J. N. Israelachvili, and H. J. Ploehn, *Macromolecules* **30**, 3329-3339 (1997).
19. "Molecular-Level Modeling of the Viscoelasticity of Crosslinked Polymers: Effect of Time and Temperature", P. P. Simon and H. J. Ploehn, *Journal of Rheology* **41**, 641-670 (1997).
18. "Analysis of Transient Hydrogen Uptake by Metal Alloy Particles", W. Zhang, S. Srinivasan, and H. J. Ploehn, *Journal of the Electrochemical Society* **143**, 4039-4047 (1996).
17. "A Microcalorimetric Investigation of the Thermodynamics and Kinetics of Hydrating-Dehydrating Reactions", W. Zhang, M. P. Sridhar Kumar, A. Visintin, S. Srinivasan, and H. J. Ploehn, *Journal of Alloys and Compounds* **242**, 143-152 (1996).
16. "Solution of the Self-Consistent Field Model for Polymer Adsorption by Genetic Algorithms", V. Hanagandi, H. J. Ploehn, and M. Nikolaou, *Chemical Engineering Science* **51**, 1071-1078 (1996).
15. "Dynamic Mechanical Analysis of the Effect of Water on Glass Bead-Epoxy Composites", J. Y. Wang and H. J. Ploehn, *Journal of Applied Polymer Science* **59**, 345-357 (1995).
14. "Production of Polystyrene Particles Via Aerosolization", S. Norasetthekul, A. M. Gadalla, and H. J. Ploehn, *Journal of Applied Polymer Science* **58**, 2101-2110 (1995).
13. "AC-Impedance Studies on Metal Hydride Electrodes", W. Zhang, M. P. Sridhar Kumar, A. Visintin, H. J. Ploehn, and S. Srinivasan, *Journal of the Electrochemical Society* **142**, 2935-2943 (1995).
12. "A Combined Instrument for Phase Analysis Light Scattering and Dielectric Spectroscopy", J. F. Miller, O. A. Velev, S. C. C. Wu, and H. J. Ploehn, *Journal of Colloid Interface Science* **174**, 490-499 (1995).
11. "Synthesis and Characterization of Epoxy-Functional Polystyrene Particles", J. A. Kling and H. J. Ploehn, *Journal of Polymer Science: Part A: Polymer Chemistry* **33**, 1107-1118 (1995).
10. "Compression of Polymer Interphases", H. J. Ploehn, *Macromolecules* **27**, 1627-1636 (1994).
9. "Structure of Adsorbed Polymer Layers: Molecular Volume Effects", H. J. Ploehn, *Macromolecules* **27**, 1617-1626 (1994).
8. "Self-Consistent Field Theory for Polymer Adsorption: Molecular Volume Effects", H. J. Ploehn, *Colloids and Surfaces* **86**, 25-40 (1994).
7. "Rheology of Aqueous Suspensions of Polystyrene Latex Stabilized by Grafted Poly(ethylene oxide)", H. J. Ploehn and J. W. Goodwin, *Faraday Discussions of the Chemical Society*, **90**, 77-90 (1991).
6. "Chemical Grafting of Poly(ethylene oxide) onto Polystyrene Latex: Synthesis, Characterization, and Rheology", H. J. Ploehn and J. W. Goodwin, in *Polymers as Rheology Modifiers* (D.N. Schulz, J.E. Glass, eds.), *ACS Symp. Ser.* **462**, 88-100 (1991).
5. "Interactions between Soluble Polymer and Colloidal Particles", H. J. Ploehn and W. B. Russel, *Advances in Chemical Engineering* **15**, 137-228 (1990).
4. "Self-Consistent Field Theory of Polymer Adsorption: Matched Asymptotic Solution Describing Tails", H. J. Ploehn and W. B. Russel, *Macromolecules* **22**, 266-276 (1989).
3. "Extensions of the Self-Consistent Field Theory of Polymer Adsorption: Matched Asymptotic Solution Describing Tails", H. J. Ploehn and W. B. Russel, *Colloids and Surfaces* **31**, 31-32 (1988).
2. "Self-Consistent Field Model of Polymer Adsorption: Generalized Formulation and Groundstate Solution", H. J. Ploehn, W. B. Russel, and C. K. Hall, *Macromolecules* **21**, 1075-1085 (1988).
1. "Lateral Migration Mechanisms in Capillary Hydrodynamic Chromatography", H. J. Ploehn, *International Journal of Multiphase Flow* **13**, 773-784 (1987).

## PATENTS

4. "Preparation of Conjugated Aromatic/Heteroaromatic Oligomer-Containing Dielectric Polymers and Their Applications", Chuanbing Tang, Yali Qiao, Harry J. Ploehn, and Sayful Islam, US 9,346,906, issued May 24, 2016.
3. "Systems and Methods for Measurement of Gas Permeation through Polymer Films", H. J. Ploehn, J. R. Monnier, and X. Chen, US 8,424,367, issued April 23, 2013.
2. "Methods for Making Layered Mixed-Metal Phosphonates for High Dielectric Strength Polymer Nanocomposites", A. P. Barber, III, H. J. Ploehn, and H.-C. zur Loye, US 8,247,586, issued August 21, 2012.
1. "Layered Mixed-Metal Phosphonates for High Dielectric Strength Polymer Nanocomposites", A. P. Barber, III, H. J. Ploehn, and H.-C. zur Loye, US 8,080,600, issued December 20, 2011.

## NON-REFEREED PUBLICATIONS AND CONFERENCE PROCEEDINGS

10. "Composite for Energy Storage Takes the Heat", Harry J. Ploehn, *Nature* **523**, 536-7 (2015).
9. "Investigation of Composition and Processing Parameters on the Mechanical Properties of Magadiite/SBR Composites", Yating Mao, Shigeng Li, Hans-Conrad zur Loye, and Harry J. Ploehn, Proceedings of the Fall 186<sup>th</sup> Technical Meeting of the Rubber Division of the American Chemical Society, Paper No. 56 (2014).
8. "Synthesis and Mechanical Properties of Magadiite/SBR Composites", S. Li and H. J. Ploehn, Proceedings of the Fall 182<sup>nd</sup> Technical Meeting of the Rubber Division of the American Chemical Society, Paper No. 16 (2012).
7. "High Energy Density Polymer Composites for Pulse Power Applications", S. Balasubramanian, S. Gong, P. Muzykov, H.-C. zur Loye, T. Sudarshan, and H. J. Ploehn, Annual Report of the IEEE Conference on Electrical Insulation and Dielectric Phenomena (2010).
6. "Embedded Sphere Method for Measuring Dielectric Breakdown in Polymers and Polymer Composites", H. J. Ploehn, S. Balasubramanian, P. Muzykov, H.C. zur Loye, and T. Sudarshan, Annual Report of the IEEE Conference on Electrical Insulation and Dielectric Phenomena (2009).
5. "Continuum and Statistical Mechanics-Based Models for Solid Electrolyte Interfaces in Lithium-Ion Batteries", H. J. Ploehn (50%), P. Ramadass, R. E. White, D. Altomare, and P. B. Balbuena, in Lithium-Ion Batteries: Solid-Electrolyte Interphase, P. B. Balbuena and Y. Wang, Eds., Imperial College Press, London, 2004, pp. 276-307.
4. "Modeling the Effects of Ion Association on Direct Current Polarization of Solid Polymer Electrolytes", C. Lin, R. E. White, and H. J. Ploehn (100%), in Rechargeable Lithium Batteries (M. Doyle, E. Takeuchi, K.M. Abraham, Eds.), PV-2000-21, The Electrochemical Society, Pennington, NJ, pp. 437-456, 2000.
3. "A Non-Equilibrium Point Defect Model for Time-Dependent Passivation of Metal Surfaces", B. Krishnamurthy, R. E. White, and H. J. Ploehn (100%), in Oxide Films (K.R. Hebert, R.S. Lillard, B.R. MacDougall, Eds.), PV-2000-4, The Electrochemical Society, Pennington, NJ, pp. 84-90, 2000.
2. "Molecular-Level Modeling of the Viscoelasticity of Crosslinked Polymers", P. P. Simon and H. J. Ploehn (100%), Proceedings of the XIIth International Congress on Rheology, edited by A. Ait-Kadi, J. M. Dealy, D. F. James, and M. C. Williams, pp. 238-239 (1996).
1. "Oxidation of Byproduct Calcium Sulfate Hemihydrate from Coal-Fired Power Plants to Chemical Gypsum in the Slurry Form", S. Bhatt, D. Saylak, H. J. Ploehn, and D. Golden, Proceedings of the Fourth International Conference on Flue Gas Desulfurization and Synthetic Gypsum (1995).

## POST-DOCTORAL RESEARCHERS

11. Chen, Xiaoming, "Gas Barrier Characterization of Polymer Nanocomposites", 11/07 – 4/14.
10. Gao, Hongsheng, "Characterization of Synthetic Platelet Materials and Polymer Nanocomposites", 8/06 – 12/11.
9. Ma, Jisheng, "Synthesis of PET-Platelet Nanocomposites", 8/05 – 8/06.
8. Ramasamy, Ramarajan, "Performance Modeling of Lithium-Seawater Batteries", 5/05 – 12/05.
7. Rajeev, Rajvihar S., "Characterization of Polymer-Clay Nanocomposites", 9/03 – 9/04.
6. Chen, Lifeng, "Modeling Efforts for the Advanced Alternate Power Source", 9/03 – 7/04.
5. Al-Muhtaseb, Shaheen, "Characterization of Polymer-Clay Nanocomposites", 11/02 – 8/03.

4. Simon, Philip P., "Predicting Equilibrium Microstructure and Transport Properties of Perfluorinated Ionomers", 1/96 - 12/98.
3. Kling, Janet A., "Predicting Emulsion Stability from Thin Film Draining Measurements", 4/95 - 6/95.
2. Chuang, Tsung-Kai, "Extracting Interfacial Properties from Thin Film Draining Measurements", 6/94 - 12/94.
1. Miller, John F., "Development of a Combined Instrument for Dielectric Spectroscopy and Phase Analysis Light Scattering", 6/92 - 12/93.

### **DOCTORAL STUDENTS**

18. Wahab, Zaidul, "Surface Modification of Nanodiamond and Its Incorporation in Nanodiamond/PEEK Nanocomposites", 11/12/15.
17. Mao, Yating, "Impact of Formulation and Processing Parameters on Mechanical Properties of Magadiite/Elastomer Composites", 9/10/15.
16. Shori, Shailesh, "Surface Modification of Nanoplatelets in Polymer Nanocomposites", 11/13/14.
15. Islam, Md. Sayful, "Polymer Nano-Dielectrics for High Density Energy Storage", 6/2/14.
14. Li, Shigeng, "Reinforcement and Energy Dissipation in Platelet-Filled Elastomers", 4/26/12.
13. Balasubramanian, Shiva, "Polymer Composite Dielectric Materials for Pulse Power Applications" 5/12/11.
12. Anguchamy, Yogesh, "Synthesis and Characterization of Polymer Composite Materials for Battery Cathodes and Capacitors" (co-advised with Dr. Branko Popov), 3/5/10.
11. Xie, Hong, "Dendrimer-Derived Bimetallic Pt-Cu Catalysts: Synthesis, Characterization, and Evaluation" (co-advised with Dr. C. T. Williams), 7/11/07.
10. Gu, Yunlong, "Synthesis, Characterization and Catalytic Application of Dendrimer-Stabilized Metal Nanoparticles" (11/17/06).
9. Krishnamurthy, Balaji, "Modeling the Formation of Passive Films on Metal Surfaces", 8/20/01.
8. Lin, Changqing, "Modeling Ionic Transport in Solid Polymer Electrolytes and Supercapacitors", 7/18/01.
7. Krueger, Jeffrey J., "Modeling Microstructural Phase Behavior in Perfluorosulphonated Ionomers", 12/18/00.
6. Wang, Jo-Yu, "Predicting Emulsion Stability from Thin Film Draining Measurements", 4/18/99.
5. Yost, Michael J., "Modeling the Effects of Collagen Microstructure and Chemistry on Tissue Growth and Hypertrophy" (co-advised with Thomas Borg, USC School of Medicine), 12/17/98.
4. Hanus, Leo H., "Synthesis and Light Scattering Studies of Nanoparticles", 11/12/98.
3. Simon, Philip P., TAMU, "Modeling the Water-Modified Microstructure and Viscoelasticity of Epoxy Resins and their Composites", 9/1/95.
2. Kling, Janet A., TAMU, "Synthesis and Characterization of Colloidal Surfaces with Grafted Polymer Layers", 3/24/95.
1. Lin, Ter-Hai, TAMU, "Self-Consistent Field Theory for Polyelectrolyte Interfaces", 11/29/94.

### **MASTER OF SCIENCE STUDENTS**

8. Wang, Jun, "Application of the Coupled Dipole Method for Predicting Swelling and Exfoliation Behavior of Layered Inorganic Materials", 6/30/10.
7. Li, Shigeng, "Mechanical Properties of PET and PS Nanocomposites", 10/24/08.
6. Auddy, Kausick, "Synthesis and Characterization of PET-Platelet Nanocomposites", 7/11/07.
5. Liu, Chunyan, "Characterization of Platelet Materials and PET/Montmorillonite Nanocomposites", 12/13/05.
4. Wu, Samuel C. C., TAMU, "Investigation of PEO - Coated Polystyrene Latex by Phase Analysis Light Scattering and Photon Correlation Spectroscopy", 2/10/95.
3. Norasetthekul, Somchintana, TAMU, "Production of Polystyrene Particles Via Aerosolization", 10/26/94.
2. Bhatt, Sandeep, TAMU, "Oxidation Kinetics of Flue Gas Desulfurization Byproduct and Its Utilization", 10/24/94.
1. Wang, Jo-Yu, TAMU, "Investigation of the Effects of Water on the Dynamic Mechanical Properties of an Epoxy Matrix Composite", 10/28/93.



## RESEARCH CONTRACTS AND GRANTS

### Summary

- Submitted External Proposals (1988 – present): 122
- Externally-Funded Research Grants: 29 (\$9,827,768 total award value)
- Externally-Funded Grants as Principal Investigator: 18 (\$4,594,731 total award value)
- Externally-Funded Infrastructure Grants: 4 (\$24.6M total award value)
- Internally-Funded Research & Infrastructure Grants: 25 (\$1,948,936 total award value)
- Research Expenditures (HJP research group) \$4.6M (\$3,908K external, \$698K institutional)

### *Externally-Funded Research Grants (listed by submitted external proposal number)*

120. National Science Foundation, “I-Corps: Measuring Parallel Permeation of Gases through Barrier Packaging Materials”, \$50,000, submitted 8/12/13, awarded 9/18/13 for 10/1/13-9/30/14 (IIP-1356047).
116. SC Space Grant Program, “A Materials Toolbox Approach for Synthesis and Characterization of Polymer Nanocomposites”, \$30,000, submitted 2/14/12, awarded 5/1/12-4/30/13.
113. Michelin Americas Research Corporation, “Reinforcement and Energy Dissipation in Platelet-Filled Elastomers”, \$132,000, submitted 5/6/11, awarded 1/1/12.
111. U.S. Department of Agriculture, “A US-China Joint Program on Forestry Biomass Utilization for Sustainable Materials and Nanotechnologies” (co-PI with PI Chuanbing Tang), \$149,979, submitted 1/18/11, awarded for \$98,937. Ploehn share \$32,979.
109. Office of Naval Research, “Block Copolymer Nanodielectrics-Towards High Energy Density Capacitors” (as senior investigator, PI Chuanbing Tang), \$263,586, submitted 10/18/2010, awarded 12/1/10-2/28/14. Ploehn share \$37,650.
104. Michelin Americas Research Corporation, “Energy Storage and Dissipation Mechanisms in Elastomeric Polymer Nanocomposites” (as PI, with co-PI H.-C. zur Loye and W. Sandberg), \$50,000, submitted 12/23/08, awarded, 2/1/09-1/31/10.
103. Department of Defense, Air Force Research Laboratory (via Universal Technology Corporation), “Polymer Nanocomposites for Energy Storage and Pulsed Power” (as co-PI, with PI H. C. zur Loye), \$672,890, submitted 8/21/08, awarded, 2/27/09-6/26/10. Ploehn share \$315,334.
102. Montana Polysaccharides/DARPA, “Solution Characterization of Levan”, \$40,000, submitted 3/7/08, awarded, 5/1/08-10/31/08.
99. Department of Defense, Experimental Program to Stimulate Competitive Research, “Polymer Nanocomposites as Future Materials for Defense and Energy Applications: High Energy Density Storage Systems with Reduced Size and Weight for Pulse Power Applications” (as co-PI, with PI H. C. zur Loye), \$750,000, submitted 10/9/07, awarded 7/15/08-7/14/11. Ploehn share \$225,000.
95. National Science Foundation, “PFI: Polymer Nanocomposites Manufacturing Partnership” (as PI, co-PIs H. Pastides, D. Pond, W. R. Sandberg, and H. C. zur Loye,), \$600,000 (3 years), submitted 8/30/06, awarded, 3/1/07-2/28/10. Ploehn share \$274,571.
94. Department of Defense, Air Force Research Laboratory (via Universal Technology Corporation), “Polymer Nanocomposites as Future Materials for Defense and Energy Applications” (as co-PI, with PI H. C. zur Loye and co-PI C. J. Murphy), \$901,480 (2 years) submitted 6/2/06, awarded, 8/25/06-4/30/08. Ploehn share \$336,546.
85. U.S. Department of Energy, “Atomic-Scale Design of a New Class of Allow Water-Gas-Shift Catalysts with Improved Sulfur Resistance” (as co-PI with M. Mavrikakis [Wisconsin], J. Dumesic [Wisconsin], M. Amiridis, and D. Chen), \$389,989 (USC subcontract portion, 3 years), submitted 10/5/04, revised budget submitted 9/9/05, \$28,000 awarded. Ploehn share \$0.
74. U.S. Central Intelligence Agency, “Modeling Efforts for the Advanced Alternate Power Source” (as PI with co-PI Perla B. Balbuena), \$609,666 (2 years), submitted 1/27/03, funded for \$415,536 on 2/27/03. Ploehn share \$282,176.
64. Department of Defense, National Reconnaissance Office, “Hybrid Advanced Power Sources-2” (as co-PI with PI R. E. White, co-PIs R. Dougal, J. Weidner, and J. A. Ritter), \$1,080,000 (18 months), submitted 5/3/01, awarded 7/1/01. Ploehn share \$60,000.
62. National Science Foundation, “NIRT: Dendrimer-Stabilized Nanoparticles for Next-Generation Catalysts” (as PI with co-PIs M. D. Amiridis and C. J. Murphy), \$2,000,000 (4 years), submitted 11/2/00, awarded 6/15/01 (CTS-0103135). Ploehn share \$772,117.

56. Department of Defense, National Reconnaissance Office, "Hybrid Advanced Power Sources" (as co-PI with PI R. E. White, co-PIs R. Dougal, J. Weidner, and J. A. Ritter), \$1,200,000 (18 months), submitted 5/1/00, \$1,150,000 awarded 7/1/00. Ploehn share \$58,758.
51. National Science Foundation, "Magnetic Separations for Environmentally Benign Processing" (as co-PI with PI J. A. Ritter), \$357,434 (3 years), submitted 7/23/99, awarded 2/7/00 for \$134,974 (2 years) (CTS-9985489). Ploehn share \$67,487.
42. Dow Chemical Company, "Predicting Emulsion and Suspension Stability from Thin Film Draining Measurements", donation of research equipment and licences, \$16,000, 8/30/96, awarded.
40. National Science Foundation, Experimental Program to Stimulate Competitive Research, "Fundamental Studies at Polymer/Material Interfaces: A Junior Faculty Development Proposal in Optical Sensing", (PI R. B. Dunlap, H. J. Ploehn added as participating investigator after award), submitted 12/6/95, awarded 2/15/97 (EPS-9630167). Ploehn share \$36,000 (direct costs only, 2 years).
39. Department of Defense, Experimental Program to Stimulate Competitive Research, "Molecular-Level Modeling of Lithium-Based Battery Cells" (as PI with co-PI R. E. White), \$479,830 (3 years, includes \$118,830 direct cost match from SC EPSCoR), submitted 9/8/95, awarded 6/21/96 (DAAH04-96-1-0422). Ploehn share \$239,915.
32. Department of Energy, Experimental Program to Stimulate Competitive Research, "Electrochemical Power Sources" (as Target Faculty, contributed approximately 5% to proposal, with PI R. E. White and various co-PIs), submitted 1/15/95, awarded 10/1/95, renewed 11/8/99 (DE-FC02-91ER75666). Ploehn share \$264,300 (direct costs only, 6 years).
31. Dow Chemical Company, "Predicting Emulsion and Suspension Stability from Thin Film Draining Measurements", \$51,283 (1 year), submitted 2/20/95, awarded 6/12/95.
30. Dow Chemical Company, "Extracting Interfacial Properties from Thin Film Draining Measurements", \$44,138 (1 year), submitted 3/29/94, awarded 6/1/94 as non-contracted gift funds for \$20,060.
29. Boehringer Ingelheim Pharmaceuticals, Inc., "Pressurized Cell for Laser-Doppler Electrophoresis", \$7,250 (6 months), submitted 10/20/93, awarded 3/11/94.
26. Dow Chemical Company, "Characterization of Colloidal Polymer Particles by Dielectric Spectroscopy", \$49,364 (1 year), submitted 4/16/93, awarded 8/2/93.
19. National Science Foundation, "NSF Young Investigator Award", \$312,500 (5 years), submitted 1/27/92, awarded 8/19/92 (CTS-9258137 [TAMU], CTS-9596071 [USC], CTS-9840329 [USC]).
16. Dow Chemical Company, "Characterization of Colloidal Polymer and Clay Particles by Dielectric Spectroscopy and Laser-Doppler Electrophoresis", \$78,506 (1 year), submitted 10/7/91; awarded 12/23/91 for \$43,030.
2. National Science Foundation, "Research Initiation Award: Molecular-Level Engineering of Polymer Interfaces in Colloidal Suspensions", \$69,998 (2 years), submitted 1/15/90, awarded 6/13/90 (CTS-9009754).
1. National Science Foundation, "Rheology of Suspensions of 'Soft' Colloidal Particles", \$33,750 (1 year), submitted 12/11/87, awarded 9/19/88 (INT-8806327).

***Externally-Funded Infrastructure Grants (listed by submitted proposal number; funding not included in HJP research expenditure total)***

105. National Institutes of Health, "SC INBRE: Competitive Renewal" (as co-PI with PI L. Pirisi-Creek), \$17,975,442, submitted 7/22/09, awarded.
78. State of South Carolina, "A Research Center of Economic Excellence for Polymer Nanocomposites: The USC NanoCenter Chair of Materials Science and Engineering", (as co-PI, with PI M. J. Myrick, co-PIs D. M. Pond, H. zur Loye, and M. Sutton), \$3,500,000, submitted 10/13/03, awarded. No direct funding for any co-investigators.
55. State of South Carolina, "USC NanoCenter" (as member of Steering and Writing Committees, contributed 25% of total effort), \$11,800,000 (5 years), submitted to the USC Provost and President and the SC State Legislature on 3/31/00. Three years of funding totaling \$3,000,000 appropriated over fiscal years 2000-2003. Center provided \$70,000 in funding to H.J. Ploehn in 2001-2003.
18. National Science Foundation Engineering Research Equipment Grant Program, "Engineering Research Equipment: Environmental Scanning Electron Microscope" (as PI with co-PI L.R. Cornwell [TAMU]), \$150,007 (1 year), submitted 1/27/92, awarded 9/4/92 (ECS-9214314).

***Internally-Funded Research Grants (competitive institutional and center-sourced awards, listed by submitted internal proposal number)***

31. USC Office of Research (ASPIRE-II), "Advanced Membranes for Solar-Hydrogen Production in a Hybrid Sulfur Electrolyzer", (as co-PI with PI J. Weidner, co-PI B. Benicewicz), \$85,419, submitted 2/25/15, awarded. Ploehn share \$28,473.
30. USC Office of Research (ASPIRE-II), "Development of New Hexaferrite Related Multiferroics", (as co-PI with PI H.-C. zur Loye, co-PI MVS Chandrashekar), \$99,906, submitted 2/25/15, awarded. Ploehn share \$33,302.
29. USC Office of the Provost (Visiting Scholars Program), "Enhancing USC's Sustainability Teaching, Education and Research in Green Polymers and Composites", (as co-PI with PI Chuanbing Tang, co-PI B. Benicewicz), \$24,492, awarded. Ploehn share \$0.
25. USC Office of Research (ASPIRE-II), "A Materials Toolbox Approach for Synthesis and Characterization of Polymer Nanocomposites" (PI with co-PIs B.C. Benicewicz, H.-C. zur Loye), \$99,150, submitted 2/14/12, awarded 5/16/12-8/15/13. Ploehn share \$33,050.
22. USC Office of Research & Health Sciences, "Magellan Scholar: Synthesis and Characterization of Levan-Clay Nanocomposites" (as PI with student researcher J. Hunter), \$3,000 (2 years), submitted 5/31/06, awarded.
21. USC NanoCenter, "Polymer Nanocomposite Thrust Area" (as co-PI with PI H. C. zur Loye, \$144,000 (1 year), submitted 1/10/06, awarded. Ploehn share \$72,000.
20. USC NanoCenter, "Polymer Nanocomposite Thrust Area" (as co-PI with PI H. C. zur Loye, co-PIs T. Papathanasiou, and W. Scrivens, \$289,990 (1 year), submitted 1/10/05, awarded. Ploehn share \$72,498.
18. USC Research Foundation and USC NanoCenter, "Polymer Nanocomposite Thrust Area" (as co-PI with PI H. C. zur Loye, co-PIs T. Papathanasiou, and W. Scrivens, \$217,547 (1 year), submitted 5/19/04, awarded 5/21/04. Ploehn share \$81,067.
17. USC NanoCenter, "Catalysis Thrust Area" (as PI with co-PI C. T. Williams), \$55,000 (1 year), submitted 2/25/04, awarded 4/21/04. Ploehn share \$27,500.
16. USC Research Foundation and USC NanoCenter, "Polymer Nanocomposite Thrust Area" (as co-PI with PI H. C. zur Loye, co-PIs T. Papathanasiou, and W. Scrivens, \$111,767 (1 year), submitted 5/7/03, awarded 5/15/03. Ploehn share \$46,949.
15. USC Research Foundation, "Polymer/Clay Nanocomposites" (as co-PI with PI T. Papathanasiou, co-PIs H. C. zur Loye and W. Scrivens, \$184,829 (1 year), submitted 4/15/02, \$32,000 (HJP share) awarded 5/15/02.
14. USC NanoCenter, "Catalysis Thrust Area" (as PI with co-PI M. Amiridis), \$50,000 (1 year), submitted 10/6/01, awarded 10/8/01. Ploehn share \$25,000.
11. Carolina Venture Fund, "New Technology for Accelerated Testing of Emulsion Stability", \$36,093 (1 year), submitted 1/20/97, \$9,000 awarded 4/17/97.
10. Texas A&M University Offshore Technology Research Center, "Accelerated Testing of Fiber-Reinforced Composites Exposed to Hygrothermal and Mechanical Stresses", \$9,967 (2 years), submitted 5/29/95, awarded 8/14/95.
8. Texas A&M University Offshore Technology Research Center, "Moisture Effects upon Interphases in Model Unidirectional Laminates", \$25,000 (1 year), submitted 9/1/94, awarded 9/10/94.
7. Texas A&M University Interdisciplinary Research Initiative, "Smart Surfaces and Interfaces" (with D. Bergbreiter, Chemistry, TAMU), \$25,000 (1 year), submitted 2/17/94, awarded 4/11/94. Ploehn share \$12,500.
6. Texas A&M University Offshore Technology Research Center, "Moisture Effects Upon Interphases in Fiber Reinforced Composites", \$71,429 (1 year), submitted 4/1/93, awarded 9/8/93.
5. Texas A&M University Offshore Technology Research Center, "Moisture Effects Upon Interphases in Fiber Reinforced Composites", \$75,000 (1 year), submitted 8/10/92, awarded 8/28/92.
3. Texas A&M University Offshore Technology Research Center, "Improved Materials Design for Offshore Coatings and Composites", \$40,000 (1 year), submitted 1/25/91, awarded 10/1/91.
1. Texas A&M University Office of International Coordination, "International Enhancement Grant", \$500 (1 year), submitted 2/16/90, awarded 4/10/90.

***Internally-Funded Infrastructure Grants for Shared Instrumentation (listed by submitted internal proposal number; funding not included in HJP research expenditure total)***

27. USC Office of Research (ASPIRE-III), "Ferroelectric Characterization of Materials for Energy Storage, Radiation Detection, and Power Electronics" (as PI with co-PIs C. Tang, H.-C. zur Loye, MVS Chandrashekar, K. Mandal), \$64,100, submitted 2/25/13, awarded 5/16/13-8/15/14.
23. USC Office of Research & Health Sciences, "Acquisition of a Micro-Compounder for Polymer Materials Research" (as PI with co-PI H. C. zur Loye), \$85,680 (1 year), submitted 11/6/06, awarded, 3/1/07-2/28/08.
13. USC Office of Research, "Acquisition of a High-Performance Computer Cluster for the Design of Dendrimer-Based Nano-Catalysts" (as co-PI with PI P. Balbuena and co-PIs M. Amiridis, C. Williams, C. Murphy, D. Chen, and J. Ferry), \$33,160 (1 year), submitted 10/1/01, awarded 10/17/01.
12. USC Office of Research, "Acquisition of a Scanning Probe Microscopy System" (as PI with co-PIs M. Amiridis, P. Balbuena, C. Williams, C. Murphy, D. Chen, and J. Ferry), \$100,000 (1 year), submitted 10/1/01, awarded 10/17/01.
4. Texas Engineering Experiment Station Permanent University Fund Equipment Grant Program, "Small Angle Light Scattering Device" (with A. Letton, T. Hartwig, D. E. Bergbreiter, D. N. Little, and J. X. Kelly, all TAMU), \$70,000 (1 year), submitted 8/31/91, awarded 10/14/91 for \$45,000.

**AVAILABLE UPON REQUEST:**

- Undergraduate researchers (1991-present)
- Invited seminars and invited conference presentations
- Contributed presentations at national technical meetings
- Book reviews
- Full list of submitted proposals (1988-present)
- Department, College, and University Service Duties
- Service to the Profession (manuscript reviews, proposal reviews, and conference session organization)
- Service to the Community
- Consulting Services and Review Panels

## STUDENT TEACHING EVALUATIONS

### Fall 1997 - Present

USC College of Engineering & Computing standard forms.

“Course”: “Overall, how would you rate this course [1=poor, 5=excellent].”

“Instructor”: “Overall, I rate the performance of my instructor as [1=poor, 5=excellent].”

Term	Course	Title	No.	Ploehn's Scores	
				Course	Instructor
Spring '14	ECHE 321	Heat Flow Analysis	22/27	4.55	4.74
Fall '13	ECHE 321 + EMCH 354	Heat Flow Analysis	23/25	4.54	4.70
Spring '13	ECHE 321 + EMCH 354	Heat Flow Analysis	17/21	4.65	4.75
Fall '12	ECHE 720	Advanced Fluid Flow Anal.	21/21	4.63	4.79
Spring '12	ECHE 320	Fluid Mechanics	29/37	4.16	4.50
Fall '11	ECHE 320	Fluid Mechanics	39/47	3.89	4.29
Fall '08	ECHE 720	Advanced Fluid Flow Anal.	24/27	4.75	4.87
Fall '07	ECHE 720	Advanced Fluid Flow Anal.	4/4	5.00	5.00
Spring '07	ECHE 722	Advanced Mass Transfer	12/13	4.67	4.67
Fall '06	ECHE 789	Interfacial Engineering	11/11	4.18	4.56
Spring '06	ECHE 722	Advanced Mass Transfer	19/22	4.63	4.74
Fall '05	ECHE 720	Advanced Fluid Flow Anal.	15/15	4.80	4.87
Spring '05	ECHE 722	Advanced Mass Transfer	9/10	4.33	4.44
Fall '04	ECHE 789	Interfacial Engineering	15/18	4.47	4.80
Spring '04	ECHE 722	Advanced Mass Transfer	20/20	4.85	4.95
Fall '03	ECHE 720	Advanced Fluid Flow Anal.	20/22	4.93	5.00
Spring '03	ECHE 722	Advanced Mass Transfer	20/27	4.68	4.65
Fall '02	ECHE 389	Interfacial Engineering	6	4.50	4.75
Spring '01	ECHE 722	Advanced Mass Transfer	21	4.71	4.88
Fall '00	ENGR 360	Fluid Mechanics	17	4.35	4.64
	ENGR A360	Fluid Mech. (USC Aiken*)	3	(*)	4.33 (*)
Spring '00	ECHE 722	Advanced Mass Transfer	12	4.67	4.91
Fall '99	ENGR 360	Fluid Mechanics	19	3.94	4.18
Spring '99	ENGR 360	Fluid Mechanics	31	4.29	4.68
Fall '98	UNIV 101E	Student in Univ. (Engin.)	16	3.50	4.56
Spring '98	ECHE 722	Advanced Mass Transfer	18	4.67	5.00
Fall '97	ECHE 720	Advanced Fluid Flow Anal.	26	4.54	4.92

\* Three USC Aiken students taught via videoconferencing, surveyed using USC Aiken teaching evaluation forms.

(continued)

**Spring 1995 – Spring 1997**

USC Department of Chemical Engineering standard forms.

“Methods”: “To what extent did the instructor's teaching methods help you understand the subject matter?” [1=not at all, 5=excellent]

“Motivation”: “To what extent did the instructor's enthusiasm and interest help you learn the subject matter?” [1=not at all, 5=excellent]

“Instructor”: “Considering all aspects of your learning experiences with this instructor, how would you rate his overall performance in this course?” [1=poor, 5=excellent]

Term	Course	Title	No.	Ploehn's Scores		
				Methods	Motivation	Instructor
Spring '97	ECHE 321	Heat Flow Analysis	38	4.38	4.31	4.45
Fall '96	ECHE 720	Advanced Fluid Flow Anal.	8	4.50	4.38	4.63
Spring '96	ECHE 321	Heat Flow Analysis	37	4.19	4.22	4.30
Spring '96	ECHE 789H	Interf.Phen./Colloid.Mat.	9	3.00	3.50	3.71
Fall '95	ECHE 720	Advanced Fluid Flow Anal.	26	4.62	4.54/	4.73
Spring '95	ECHE 321	Heat Flow Analysis	24	4.54	4.46	4.58

**Spring 1990 – Spring 1995**

Texas A&amp;M University standard forms. Objective quality rating and percentile rank among TAMU instructors.

Question 9: “Overall rating of the effort of the instructor in the class.” [1=poor, 5=excellent]

Question 10: “Overall rating of the instructor's performance as an effective teacher.” [1=poor, 5=excellent]

Term	Course	Title	No.	Q#9	Q#10	Percentile Rank
Spring '95	ECHE 321	Heat Flow Analysis	24	4.71	4.74	not avail.
Fall '94	CHEN 304-501	Chem. Eng. Fluid Operations	23	4.91	4.87	96
	CHEN 304-502	Chem. Eng. Fluid Operations	49	4.86	4.73	89
Spring '94	CHEN 689-604	Interf.Phen./Colloid.Mat.	12	4.86	4.86	76
Fall '93	CHEN 304-501	Chem. Eng. Fluid Operations	39	4.82	4.72	90
	CHEN 304-502	Chem. Eng. Fluid Operations	36	4.83	4.81	94
Spring '93	ENGR 204-502	Cons. Prin. for Contin. Media	18	4.72	4.78	80
Fall '92	CHEN 304-501	Chem. Eng. Fluid Operations	31	4.87	4.87	94
	CHEN 304-502	Chem. Eng. Fluid Operations	30	4.90	4.87	95
Summer '92	CHEN 304-300	Chem. Eng. Fluid Operations	24	5.00	5.00	96
Spring '92	CHEN 689-604	Interf. Phen./Colloidal Mat.	15	4.87	4.53	60
Fall '91	CHEN 304-501	Chem. Eng. Fluid Operations	28	4.96	4.93	98
	CHEN 304-502	Chem. Eng. Fluid Operations	33	5.00	4.94	98
Spring '91	CHEN 689-604	Adv. Transp. II: Energy/Mass	8	4.88	4.63	66
Fall '90	CHEN 304-501	Chem. Eng. Fluid Operations	30	4.77	4.73	89
	CHEN 304-502	Chem. Eng. Fluid Operations	15	4.73	4.53	84
Spring '90	CHEN 689-601	Fund. of Colloidal Materials	8	4.33	4.17	not avail.