

Douglas M. Fox

Curriculum Vita

American University
Department of Chemistry
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DATE AND PLACE OF BIRTH

October 19, 1971, Cleveland, OH

EDUCATION

PhD in Physical Chemistry, advisor: Professor Leslie Leifer, Michigan Technological University, December 2001.

BS in Chemical Engineering, Michigan Technological University, May 1995.

HONORS AND AWARDS

Outstanding Doctoral Graduate Student, Michigan Technological University, 1998-1999.

Outstanding Teaching Assistant, Michigan Technological University, 1996-1997.

PROFESSIONAL EXPERIENCE

2006-present Assistant Professor, Department of Chemistry, American University, Washington DC.

2003-present NIST Guest Researcher, National Institute of Standards and Technology, Gaithersburg, MD.

2004-2006 Assistant Research Professor, Chemistry Department, U. S. Naval Academy, Annapolis, MD.

2002-2004 ASEE/NRL Postdoctoral Fellow, Chemistry Division, Naval Research Laboratory, Washington, DC.

2002 Visiting Assistant Professor, Chemistry Department, Michigan Technological University, Houghton, MI.

2001 Instructor/Laboratory Advisor, Chemistry Department, Michigan Technological University, Houghton, MI.

1995-2000 Graduate Teaching Assistant, Chemistry Department, Michigan Technological University, Houghton, MI.

REFEREED JOURNALS

D. M. Fox, P. H. Maupin, S. Bellayer, M. Murariu, R. H. Harris Jr., J. W. Gilman, D. V. Eldred, D. Katsoulis, P. C. Trulove, and H. C. De Long, "A dual nanocomposites approach to the preparation of polymer – layered silicate nanocomposites: 1. The preparation, characterization, and use of 1,2-dimethyl-3-(benzyl ethyl iso-butyl POSS)imidazolium chloride as an organic modifier in montmorillonite," *Clays Clay Miner.*, submitted.

W. A. Henderson, V. G. Young, Jr., D. M. Fox, H. C. De Long, and P. C. Trulove, "Alkyl vs. Alkoxy Chains on Ionic Liquid Cations," *Chem. Comm.*, **2006**, DOI:10.1039/B606381K.

D. M. Phillips, L. F. Drummy, R. R. Naik, H. C. De Long, D. M. Fox, P. C. Trulove, and R. A. Mantz, "Regenerated silk wet spinning from an ionic liquid solution," *J. Mater. Chem.*, **2005**, 15, 1. (hot article)

K. Dahl, G. M. Sando, D. M. Fox, T. E. Sutto, and J. C. Owrutsky, "Vibrational spectroscopy and dynamics of small anions in ionic liquid solutions," *J. Chem. Phys.*, **2005**, 123, Article #084504.

D. M. Fox, J. W. Gilman, H. C. De Long, and P. C. Trulove, "TGA decomposition kinetics of 1-butyl-2,3-dimethylimidazolium tetrafluoroborate and the thermal effects of contaminants," *J. Chem. Thermodynamics*, **2005**, 37, 900. (invited paper)

S. Bellayer, J. W. Gilman, N. Eidelmen, S. Bourbigot, X. Flambard, D. M. Fox, H. C. De Long, and P. C. Trulove, "Preparation of homogeneously dispersed trialkylimidazolium compatibilized multi-walled carbon nanotube / polystyrene nanocomposites via melt extrusion," *Adv. Funct. Mater.*, **2005**, 15, 910.

D. M. Phillips, L. F. Drummy, D. G. Conrady, D. M. Fox, R. R. Naik, M. O. Stone, P. C. Trulove, H. C. De Long, R. A. Mantz, "Dissolution and regeneration of *Bombyx Mori* silk fibroin via ionic liquids," *J. Am. Chem. Soc.*, **2004**, 126, 14350.

W. H. Awad, J. W. Gilman, M. Nyden, R. H. Harris, Jr., T. E. Sutto, J. H. Callahan, P. C. Trulove, H. C. De Long, and D. M. Fox, "Thermal degradation studies of alkyl-imidazolium salts and their application in nanocomposites," *Thermochim. Acta*, **2004**, 409, 3.

D. M. Fox, W. H. Awad, J. W. Gilman, P. H. Maupin, H. C. De Long, and P. C. Trulove, "Flammability, thermal stability, and phase change characteristics of several trialkylimidazolium salts," *Green Chem.*, **2003**, 5, 724.

D. M. Fox and L. Leifer, "Thermodynamic treatment of complex multicomponent electrolyte solutions," *Fluid Phase Equilibria*, **2003**, 213, 1.

D. M. Fox and L. Leifer, "Thermodynamic studies of ternary systems: I. LiCl-(n-Bu)₄NCl-H₂O at 25°C," *J. Phys. Chem. B*, **2000**, 104, 1058.

PEER REVIEWED CONFERENCE PROCEEDINGS

D. M. Fox, P. H. Maupin, S. Bellayer, M. Murariu, J. W. Gilman, P. C. Trulove, and H. C. De Long, "The Use of 1,2-Dimethyl-3-(Benzyl Ethyl Iso-butyl-POSS)imidazolium Chloride as an Organic Modifier in Polymer – Layered Silicate Nanocomposites," in *Proc. Int. Symp. Molten Salts XIII*, R. A. Mantz, P. C. Trulove, H. C. De Long, G. R. Stafford, and M. Matsunaga, Eds., ECS Proceedings Volume, submitted. (invited paper)

D. M. Fox, J. W. Gilman, H. C. De Long, and P. C. Trulove, "TGA Decomposition Kinetics of 1-Butyl-2,3-dimethylimidazolium Tetrafluoroborate and the Thermal Effects of Contaminants," in *Proc. Int. Symp. Molten Salts XIII*, R. A. Mantz, P. C. Trulove, H. C. De Long, G. R. Stafford, and M. Matsunaga, Eds., ECS Proceedings Volume, submitted. (invited paper)

S. Bellayer, J. W. Gilman, N. Eidelman, S. Bourgibot, X. Flambard, D. M. Fox, H. C. De Long, and P. C. Trulove, "Preparation of Homogeneously Dispersed Trialkyl Imidazolium Compatibilized Muti Walled Carbon Nanotube/Polystyrene Nanocomposites Via Melt Extrusion," in *Proc. Int. Symp. Molten Salts XIII*, R. A. Mantz, P. C. Trulove, H. C. De Long, G. R. Stafford, and M. Matsunaga, Eds., ECS Proceedings Volume, submitted. (invited paper)

R. A. Mantz, H. C. De Long, L. F. Drummy, D. G. Conrady, M. O. Stone, R. R. Naik, D. M. Phillips, D. M. Fox, and P. C. Trulove, "Processing of *Bombyx mori* Silk Using Ionic Liquids," in *Proc. Int. Symp. Molten Salts XIII*, R. A. Mantz, P. C. Trulove, H. C. De Long, G. R. Stafford, and M. Matsunaga, Eds., ECS Proceedings Volume, submitted. (invited paper)

D. M. Fox, S. Bellayer, M. Murariu, J. W. Gilman, P. H. Maupin, H. C. De Long, and P. C. Trulove, "Application of Trialkylimidazolium Liquids and Salts to the Preparation of Polymer – Layered Silicate Nanocomposites and Polymer – Carbon Nanotube Nanocomposites," Chapter in *Ionic Liquids in Polymer Systems: Solvents, Additives, and Novel Applications*, C. S. Brazel and R. D. Rogers, Eds., ACS Symposium Series, No. 913, 2005, 175-188. (invited paper)

D. M. Fox, W. H. Awad, J. W. Gilman, P. H. Maupin, T. E. Sutto, H. C. De Long, and P. C. Trulove, "Thermal and Kinetic Studies of Trialkylimidazolium Salts," Chapter in *Ionic Liquids III: Fundamentals, Progress, Challenges, and Opportunities*, R. D. Rogers and K. R. Seddon, Eds., ACS Symposium Series, No. 901, 2005. (invited paper)

P. C. Trulove, W. H. Awad, J. W. Gilman, C. Davis, R. D. Davis, T. E. Sutto, D. M. Fox, P. H. Maupin, and H. C. De Long, "Application of Trialkylimidazolium Ionic Liquids and Salts to the Preparation of Polymer-Clay Nanocomposites," Chapter in *Ionic Liquids III: Fundamentals, Progress, Challenges, and Opportunities*, R. D. Rogers and K. R. Seddon, Eds., ACS Symposium Series, No. 901, in press. (invited paper)

P. C. Trulove, W. H. Awad, J. W. Gilman, R. D. Davis, T. E. Sutto, D. M. Fox, P. H. Maupin, and H. C. De Long, "Application of Imidazolium based Ionic Liquids for the Preparation of Polymer-Clay Nanocomposites," in *Proceedings of the International Symposium on Ionic Liquids in Honour of Marcelle Gaune-Escard*, H. A. Øye and A. Jagtøyen, Eds., The Norwegian University of Science and Technology, Trondheim, Norway, 2003, 345. (invited paper)

H. C. De Long, T. E. Sutto, D. M. Fox, and P. C. Trulove, "Intercalation Power Structures in Ionic Liquids," in *Proceedings of the International Symposium on Ionic Liquids in Honour of Marcelle Gaune-Escard*, H. A. Øye and A. Jagtøyen, Eds., The Norwegian University of Science and Technology, Trondheim, Norway, 2003, 355. (invited paper)

CONFERENCE PRESENTATIONS

D. M. Fox, J. M. Green III, S. Bellayer, J. W. Gilman, D. M. Phillips, R. A. Mantz, P. C. Trulove, and H. C. De Long, "The Preparation of *Bombyx Mori* Silk Nanocomposites Using Room Temperature Ionic Liquids," 231st National ACS Meeting, Atlanta, GA, 26-30 March 2006.

J. M. Green III, D. M. Fox, H. C. De Long, and P. C. Trulove, "Using Well Known Methods in Unprecedented Ways: The Dissolution/Reconstitution of Chitin and Chitosan Using Room Temperature Ionic Liquids," 231st National ACS Meeting, Atlanta, GA, 26-30 March 2006.

J. W. Gilman, D. M. Fox, P. C. Trulove, H. C. De Long, and J. D. Stenger-Smith, "Flammability Properties of Ionic Liquids," 231st National ACS Meeting, Atlanta, GA, 26-30 March 2006.

J. W. Gilman, R. D. Davis, S. Bellayer, P. H. Maupin, D. Raghavan, J. K. Langat, S. Bourgibot, X. Flambard, D. M. Fox, P. C. Trulove, and H. C. De Long, "Use of Optical Probes and Laser Scanning Confocal Fluorescence Microscopy for High Throughput Characterization of Dispersion in Polymer Layered Silicate Nanocomposites," 229th National ACS Meeting, San Diego, CA, 13-17 March 2005.

D. M. Fox, P. H. Maupin, S. Bellayer, M. Murariu, J. W. Gilman, P. C. Trulove, and H. C. De Long, "The Use of 1,2-Dimethyl-3-(Benzyl Ethyl Iso-butyl-POSS)imidazolium Chloride as an Organic Modifier in Polymer – Layered Silicate Nanocomposites," 206th National ECS Meeting, Honolulu, HI, 3-8 October 2004. (invited presentation)

D. M. Fox, J. W. Gilman, H. C. De Long, and P. C. Trulove, "Decomposition Kinetics of 1-Butyl-2,3-Dimethylimidazolium Tetrafluoroborate and the Effects of Impurities Using TGA," 206th National ECS Meeting, Honolulu, HI, 3-8 October 2004. (invited presentation)

S. Bellayer, J. W. Gilman, N. Eidelman, S. Bourgibot, X. Flambard, D. M. Fox, H. C. De Long, and P. C. Trulove, "Preparation of Homogeneously Dispersed Trialkyl Imidazolium Compatibilized Muti Walled Carbon Nanotube/Polystyrene Nanocomposites Via Melt Extrusion," 206th National ECS Meeting, Honolulu, HI, 3-8 October 2004. (invited presentation)

R. A. Mantz, H. C. De Long, L. F. Drummy, D. G. Conrady, M. O. Stone, R. R. Naik, D. M. Phillips, D. M. Fox, and P. C. Trulove, "Processing of *Bombyx mori* Silk Using Ionic Liquids," 206th National ECS Meeting, Honolulu, HI, 3-8 October 2004. (invited presentation)

D. M. Fox, S. Bellayer, W. H. Awad, M. Murariu, R. D. Davis, J. W. Gilman, P. H. Maupin, H. C. De Long, and P. C. Trulove, "The Use of Imidazolium Based Ionic Liquids for the Preparation of Polymer - Layered Silicate and Polymer - Carbon Nanotube Nanocomposites," EUCHEM 2004 Molten Salts Conference, Piechowice, Poland, 20 - 25 June 2004. (invited presentation)

P. C. Trulove, D. M. Fox, S. Bellayer, W. H. Awad, M. Murariu, J. W. Gilman, P. H. Maupin, and H. C. De Long, "The Use of Molten Salts for the Preparation of Novel Polymer Nanocomposites," EUCHEM 2004 Molten Salts Conference, Piechowice, Poland, 20 - 25 June 2004. (invited presentation)

D. M. Fox, S. Bellayer, W. H. Awad, M. Murariu, R. D. Davis, J. W. Gilman, P. H. Maupin, H. C. De Long, and P. C. Trulove, "The Use of Imidazolium Based Ionic Liquids for the Preparation of Polymer – Layered Silicate Nanocomposites and Polymer – Carbon Nanotube Nanocomposites," Symposium on *Ionic Liquids in Polymer Systems*, 227th National ACS Meeting, Anaheim, CA, 28 March – 01 April 2004. (invited presentation)

D. M. Fox, W. H. Awad, J. W. Gilman, P. H. Maupin, T. E. Sutto, H. C. De Long, and P. C. Trulove, "Thermal and Kinetic Studies of Trialkylimidazolium Salts," Symposium on *Ionic Liquids III: Fundamentals, Progress, Challenges, and Opportunities*, 226th National ACS Meeting, New York, NY, September 2003.

P. C. Trulove, W. H. Awad, J. W. Gilman, C. Davis, R. D. Davis, T. E. Sutto, D. M. Fox, P. H. Maupin, and H. C. De Long, "Application of Trialkylimidazolium Ionic Liquids and Salts to the Preparation of Polymer-Clay Nanocomposites," Symposium on *Ionic Liquids III: Fundamentals, Progress, Challenges, and Opportunities*, 226th National ACS Meeting, New York, NY, September 2003.

D. M. Fox, W. H. Awad, R. D. Davis, J. W. Gilman, P. H. Maupin, T. E. Sutto, P. C. Trulove, and H. C. De Long, "Thermal Properties of Several Trialkylimidazolium Salts," Saskatchewan Green Chemistry Conference, Regina, SK, Canada, May 2003.

D. M. Fox and L. Leifer, "Thermodynamic Studies of Ternary Systems: III. $\text{Me}_4\text{NCl} - \text{Bu}_4\text{NCl} - \text{H}_2\text{O}$ at 25°C", Paper 276, Symposium on *Equilibrium Thermodynamics and Statistical Mechanics*, 222nd National ACS Meeting, Chicago, IL, August 2001.

L. Leifer and D. M. Fox, "Treatment of Systems Which Do Not Obey Harned's Rule", Paper P1-MON-3, Symposium on *Connections Between Theory and Experiment*, 16th IUPAC Conference on Chemical Thermodynamics, Halifax, Nova Scotia, August 2000.

D. M. Fox and L. Leifer, “Thermodynamics of Studies of Ternary Systems: II. LiCl - Bu₄NCl - H₂O at 25°C and High Total Ionic Strengths”, Paper P7-MON-3, Symposium on *Other Aspects of Thermodynamics*, 16th IUPAC Conference on Chemical Thermodynamics, Halifax, Nova Scotia, August 2000.

EXTERNAL FUNDING

Travel Grant for chairing sessions in the Molten Salts 15 (MS 15) Symposium, funding of \$1750 combined from the National Science Foundation and the Electrochemical Society (ECS) MS 15 Symposium Committee. MS 15 Symposium held at the ECS 2006 Joint International Meeting in Cancun, Mexico, 29 October – 3 November 2006.

Co-PI with Dr. Richard Colton (NRL, PI) on “Examination of Non-enzymatic Synthesis of Peptides and Polypeptides in Ionic Liquids,” funding of \$42,000 for CY03 from Air Force Office of Scientific Research. Funds transferred to the Naval Research Laboratory. Work carried out at the Naval Research Laboratory.

COURSE EXPERIENCE

2006 Advanced Physical Chemistry

2006 Advanced Physical Chemistry Laboratory

2005 Foundations of Chemistry II

- Emphasized naval applications of chemistry
- Taught both lecture and laboratory
- Utilized web-based educational program, Blackboard

2002 Introduction to Inorganic, Organic, and Biochemistry

- Emphasized applications to environmental and biological sciences
- Actively participated in associated laboratory
- Worked closely with Chemistry Learning Center staff

2001-2002 Physical Chemistry I

- Integrated course with Mathcad
- Emphasized derivations from fundamental principles
- Utilized examples related to chemical engineering (majority of students taking this course majored in chemical engineering)

2001-2002 Physical Chemistry Laboratory I

- Corrected theories previously given for experimental summaries
- Developed new experiments with real life applications

- Demonstrated good experimental techniques

SCHOLARSHIP AND SCHOLARLY ACTIVITIES

- Mentored midshipman in senior year Capstone Research program.
- Mentored students and scientists working at NIST and NRL in DSC techniques.
- Boy Scouts Merit Badge Counselor (Chemistry).
- Used analytical equipment expertise to assist in Integrated Lab course.
- Participated in the renovation of Eastern High School (Washington D.C.).
- Tutored student athletes at Michigan Technological University.
- Helped maintain chemical engineering computer lab as ChemE Partner.

PROFESSIONAL ORGANIZATIONS AND AFFILIATIONS

American Chemical Society

American Institute of Chemical Engineers

Electrochemical Society

Blue Key National Honor Fraternity

Phi Lambda Upsilon

Sigma Xi