

William A Phillip

Department of Chemical Engineering
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Education

Doctor of Philosophy, Chemical Engineering June 2009
Department of Chemical Engineering and Material Science
University of Minnesota
Minneapolis, MN
Advisor: Dr. Edward L. Cussler Jr.
Research: Block Polymer Membranes for Selective Separations
GPA: 3.85/4.00

Bachelor of Science, Chemical Engineering May 2004
University of Notre Dame
Notre Dame, IN
GPA: 3.86/4.00

Research Experience

Postdoctoral Associate, Yale University July 2009 – Present
Department of Chemical Engineering, Environmental Engineering Program
Advisor: Dr. Menachem Elimelech

- Fabricated and characterized thin-film composite membranes for forward osmosis applications. Membranes were produced using phase inversion and interfacial polymerization protocols.
- Developed a model that describes the reverse diffusion of draw solutes in forward osmosis operations, and established the experimental procedures used to test the model.
- In collaboration with material scientists from Cornell University, produced novel ultrafiltration, nanofiltration, and osmosis membranes that use new classes of nanomaterials including nanoionic materials (NIMs) and block polymers.

Graduate Research Assistant, University of Minnesota Sept. 2004 – June 2009
Department of Chemical Engineering and Material Science
Advisor: Dr. Edward L. Cussler Jr. (CEMS)

- Developed experimental technique to characterize the diffusion of a variety of gases across membranes made from our novel nanoporous materials. Using this technique, established results that are consistent with theoretical predictions and other material characterization techniques (i.e. SEM and SAXS).
- Determined experimental conditions necessary for microstructure of interest to self assemble during the membrane casting process.
- Evaluated the practical value of the new nanoporous materials developed in our labs by establishing the sieving curve and fouling characteristics for our materials and traditional ultrafilters.
- Developed ammonia selective membranes based on a crosslinked sulfonated copolymer. The membrane structure was tailored such that the common phenomenon of membrane conditioning (i.e. the loss of selectivity at high feed pressures) is significantly suppressed.

Undergraduate Research Assistant, University of Notre Dame
Department of Chemical and Biomolecular Engineering
Advisor: Dr. Arvind Varma

Jan 2002 – May 2004

- Studied the reaction kinetics and optimization of methanol oxidative dehydrogenation in a packed bed membrane reactor.
- Built a system to study the gas-liquid reaction of glucose hydrogenation in a permeable membrane reactor.

Teaching Experience

Graduate Teaching Assistant, University of Minnesota
Department of Chemical Engineering and Material Science

CHEN 4006: Mass Transfer and Separations

Spring 2006

Instructor: E.L. Cussler

- Guided student learning through individual sessions in weekly office hours, feedback was provided through grading of homework assignments and exams.
- Presented course content in weekly tutorial sections of 25 students using self developed notes and supplemental course material.

CHEN 4502: Chemical Product Design

Spring 2007, Spring 2008

Instructor: E.L. Cussler

- Developed, administered and graded course homework assignments and exams.
- Organized and presented specific subject matter for various lectures to class of 115 students enrolled in the course.

Undergraduate Research Opportunities Program, University of Minnesota

Spring 2006 – June 2009

Department of Chemical Engineering and Material Science

- Guided the research efforts of two undergraduate chemical engineering honors students to successful completion of their undergraduate thesis projects. The work resulted in three published articles in peer reviewed journals.

Undergraduate Chemistry Tutor, University of Notre Dame
First Year of Studies

General Chemistry I/General Chemistry II

Fall 2001 – Spring 2004

- Used active learning strategies and provided tutoring support to promote student understanding of course material.

Honors and Awards

Chemical Engineering Teaching Assistant of the Year, University of Minnesota	2006
Graduate School Fellowship, University of Minnesota	2004
Chemical Engineering Alumni Award, University of Notre Dame	2004
Summa Cum Laude, University of Notre Dame	2004
Tau Beta Pi	2002
Dean's List, University of Notre Dame	2000-2004
Eagle Scout, Boy Scouts of America	1999

Publications

- Monique Roerdink, William A. Phillip, E.L. Cussler, Marc Hillmyer, "Pore-Wall Functionalized Nanoporous Membranes Using Reactive ABC Triblock Terpolymers", in preparation.
- Alberto Tiraferri, Ngai Yin Yip, William A. Phillip, Jessica D. Schiffman, Menachem Elimelech, "Relating Performance of Thin-Film Composite Forward Osmosis Membranes to Support Layer Formation and Structure", *Journal of Membrane Science*, in preparation.
- William A. Phillip, Marc Hillmyer, E.L. Cussler, "Predicting the Orientation of Cylinders Formed Within Block Copolymers", *Macromolecules*, submitted.
- William A. Phillip, Jui Shan Yong, Menachem Elimelech, "Reverse Draw Solute Permeation in Forward Osmosis: Modeling and Experiments", *Environmental Science & Technology*, ASAP.
- Ngai Yin Yip, Alberto Tiraferri, William A. Phillip, Jessica D. Schiffman, Menachem Elimelech, "A High Performance Thin-Film Composite Membrane", *Environmental Science & Technology*, 2010, 44, 3812-3818.
- William A. Phillip, B. O'Neill, Marc Rodwogin, Marc Hillmyer, E.L. Cussler, "Self-Assembled Block Polymer Membranes Used for Water Filtration", *ACS Applied Materials & Interfaces*, 2010, 2, 847-853.
- William A. Phillip, E. Martono, Liang Chen, Marc Hillmyer, E.L. Cussler, "Selective Membrane Separations for Ammonia", *Journal of Membrane Science*, 2009, 337, 39-46.
- William A. Phillip, B. O'Neill, Mark Amendt, Marc Hillmyer, E.L. Cussler, "Diffusion and Flow Across Poly(dicyclopentadiene)-Based Membranes", *ACS Applied Materials & Interfaces*, 2009, 1, 472-480.
- Liang Chen, William A. Phillip, E.L. Cussler, Marc Hillmyer, "Robust Nanoporous Membranes Templated by a Doubly Reactive Block Copolymer" *Journal of the American Chemical Society*, 2007, 129, 13786-13787.
- William A. Phillip, Javid Rzayev, Marc Hillmyer, E.L. Cussler, "Gas and Liquid Transport through Nanoporous Block Copolymer Membranes" *Journal of Membrane Science*, 2006, 286, 144-152.

Conferences and Proceedings

- William A. Phillip, Jui Shan Yong, Menachem Elimelech, "Reverse Draw Solute Permeation in Forward Osmosis: Modeling and Experiments" ACS National Meeting 2010, San Francisco, CA. Speaker – March 2010.
- William A. Phillip, Brandon O'Neill, Marc Rodwogin, Marc Hillmyer, E.L. Cussler, "Controlling the Self-Assembly of Pores in Water Purification Membranes" AIChE National Meeting 2009, Nashville, TN. Speaker – November 2009.
- William A. Phillip, "Utilization of Block Copolymers as Ultrafiltration Membranes" AFS National Meeting 2009, Minneapolis, MN. Student Speaker – May 2009.
- William A. Phillip, Mark Amendt, Brandon O'Neill, Marc Hillmyer, E.L. Cussler, "Utilization of Block Copolymers as Ultrafiltration Membranes" AIChE National Meeting 2008, Philadelphia, PA. Student Speaker – November 2008.

William A. Phillip, E. Martono, Liang Chen, Marc Hillmyer, E.L. Cussler, “Selective Membrane Separations for Ammonia” AIChE National Meeting 2008, Philadelphia, PA. Student Speaker – November 2008.

William A. Phillip, Marc Hillmyer, E.L. Cussler, “Controlling the Self Assembly of Block Copolymers to Develop Water Purification Membranes” AIChE National Meeting 2008, Philadelphia, PA. Poster Presentation – November 2008.

William A. Phillip, Mark Amendt, Marc Hillmyer, E.L. Cussler, “Utilization of Block Copolymers as Ultrafiltration Membranes” Gordon Research Conference Environmental Science: Water, Holderness, NH. Poster Presentation – June 2008.

William A. Phillip, Marc Hillmyer, E.L. Cussler, “Preparation of Ultrafiltration Membranes from Block Copolymers” I-PRIME Coatings Workshop, University of Minnesota, Minneapolis, MN. Student Speaker – May 2007.

Positions and Activities

Engineers Without Borders, Graduate Student Mentor, University of Minnesota	Jan. 2005 – May 2009
Department of Chemical Engineering, Social Chair, University of Minnesota	Jan. 2005 – Jan. 2006
Notre Dame Men’s Boxing Club	Jan. 2002 – May 2004

URL: http://www.yale.edu/env/elimelech/People_Page/william_a_phillip_page/william_phillip.html