

DAVID CHILDERS

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| CONTACT INFORMATION | 50 N. Northwest Hwy, Unit 303 Park Ridge, IL 60068 | (260) 413-7884 childers.david@gmail.com |
| EDUCATION | University of Illinois at Chicago, Chicago, Illinois <i>Department of Chemical Engineering</i> Ph.D., Chemical Engineering | 2014 |
| | University of Michigan, Ann Arbor, Michigan <i>Department of Chemical Engineering</i> B.S., Chemical Engineering | 2009 |
| EXPERIENCE | Northwestern University, Evanston, Illinois <i>Postdoctoral Fellow, Department of Chemical Engineering</i> <i>Advisor: Professor Justin Notestein</i> Topic: Ethanol Carbonylation and NO reduction <ul style="list-style-type: none">• Tested catalysts to determine performance and stability of NO reduction and high pressure ethanol carbonylation reactions• Synthesized transition metal catalysts (Fe, Co, Mn, Ag, Cu and Rh) on various supports (ceria, zeolites, polymers, solid acids and silica) for both reactions• Synthesized ceria nanoparticles of various shapes through hydrothermal and microwave synthesis methods• Investigated ceria for support properties including oxygen vacancy density, structural information and redox properties using TEM, DRIFTS and Raman spectroscopy• Characterized materials by GC, MS, GC-MS, UV-VIS, DRIFTS, ICP, TGA, TPD, Raman and TEM• Evaluated the effect of synthesis conditions on NO_x reduction performance and stability | 2014 - present |
| | University of Illinois at Chicago/Argonne National Lab, Illinois <i>Graduate Research Assistant, Department of Chemical Engineering</i> <i>Advisor: Professor Randall Meyer, Professor John Regalbuto & Dr. Jeff Miller</i> Topic: An Exploration of Geometric and Electronic Effects in Metal Nanoparticle Catalysts <ul style="list-style-type: none">• Synthesized Ag, Pt, Pd and Pd bimetallic (Zn, Au and Pt) catalysts using Strong Electrostatic Adsorption and Incipient Wetness Impregnation on silica supports• Tested pH stability of various catalyst supports (SiO₂, TiO₂ and carbon) and Ag metal precursors• Characterized materials using GC, ICP, BET, STEM, EDXS, XRD, XPS, DSC, TPR, DRIFTS, EXAFS, and chemisorption• Analyzed kinetics using neopentane hydrogenolysis and propane dehydrogenation reactions• Created a PdZn intermetallic catalyst that outperformed industrial catalysts for propane dehydrogenation• Determined a relationship between the thickness of a Pd surface layer to reactivity on PdAu nanoparticles for hydrocarbon reactions• Discovered a correlation between neopentane isomerization selectivity and initial CO heats of adsorption for Pt and Pd catalysts independent of particle size and metal identity• Collaborated with several research groups to provide STEM images, CO chemisorption data, EXAFS and DRIFTS spectra• Used XANES of <i>in situ</i> CO adsorption to determine surface composition of PtPd bimetallic particles <i>Graduate Teaching Assistant, Department of Chemical Engineering</i> <ul style="list-style-type: none">• CHE 382: Chemical Engineering Laboratory II, 2013 | 2010 - 2014 |
| | University of Michigan, Ann Arbor, Michigan <i>Undergraduate Research Assistant, Department of Chemical Engineering</i> <i>Advisor: Professor Levi Thompson</i> Topic: Autothermal reforming reactions for hydrogen production and electrochemistry <ul style="list-style-type: none">• Set up, monitored using a GC, and analyzed autothermal reforming reactions for H₂ production | 2008-2009 |

- Synthesized catalysts using reactor systems and determined surface areas using BET
- Tested capacitors using Cyclic Voltammetry

University of New South Wales, Sydney, NSW, Australia

2007

Undergraduate Study Abroad Program in Renewable Energy

Topic: Energy Tomorrow

- Studied various forms of renewable energy (wind, solar, geothermal, alternative fuels, green architecture, etc.)
- Final project topic: current and future viability of photovoltaics

PUBLICATIONS

C. Roberts, L. Savereide, **D. Childers**, T. Peck, J. Notestein, In situ FTIR spectroscopy of highly dispersed FeOx catalysts for NO reduction: Role of Na promoter. *Catalysis Today* (2016).

B. Hu, N. Schweitzer, G. Zhang, S. Kraft, **D. Childers**, M. Lanci, J. Miller, A. Hock, Isolated FeII on Silica As a Selective Propane Dehydrogenation Catalyst. *ACS Catalysis* (2015).

J. Gallagher, **D. Childers**, R. Meyer, H. Zhao, R. Winans, R. Meyer, J. Miller, Structural Evolution of an intermetallic Pd-Zn catalyst selective for propane dehydrogenation. *Physical Chemistry Chemical Physics* (2015) **17**, 28144-28153.

D. Childers, R. Rioux, J. Miller, R. Meyer, Evidence for geometric effects in neopentane conversion on PdAu catalysts. *Catalysis Science & Technology* (2014)

D. Childers, N. Schweitzer, S. Shahari, R. Rioux, J. Miller, R. Meyer, Modifying Structure Sensitive Reactions by Addition of Zn to Pd. *Journal of Catalysis* 318 (2014) 75-84.

S. Kraft, G. Zhang, **D. Childers**, F. Dogan, J. Miller, S. Ngyuen, A. Hock, Rhodium Catechol Containing Porous Organic Polymers: Defined Catalysis for Single-Site and Supported Nanoparticle Materials. *ACS Organometallics* 33 (2014) 2517-2522.

J. Liu, Z. Guo, **D. Childers**, N. Schweitzer, C. Marshall, R. Klie, J. Miller, R. Meyer, Correlating the Degree of Metal-promoter Interaction to Ethanol Selectivity over MnRh/CNTs CO Hydrogenation Catalysts. *Journal of Catalysis* 313 (2014) 149-158.

D. Childers, A. Saha, N. Schweitzer, R. Rioux, J. Miller, R. Meyer, Correlating Heat of Adsorption of CO to Reaction Selectivity: Geometric Effects vs. Electronic Effects in Neopentane Isomerization over Pt and Pd Catalysts. *ACS Catalysis* 3 (2013) 2487-2496.

T. Wu, **D. Childers**, C. Gomez, A. Karim, N. Schweitzer, A. Kropf, H. Wang, T. Bolin, Y. Hu, L. Kovarik, R. Meyer, J. Miller, General Method for Determination of the Surface Composition in Bimetallic Nanoparticle Catalysts from the L Edge X-ray Absorption Near-Edge Spectra. *ACS Catalysis* 2 (2012) 2433-2443.

PAPERS IN PREPARATION

E. Kyriakidou, C. Papadimitriou, **D. Childers**, O. Alexeev, J. Regalbuto, M. Amiridis, Ag Diammine Impregnation on Oxides and Carbon Using Strong Electrostatic Adsorption

V. Paidi, L. Savereide, **D. Childers**, J. Notestein, C. Roberts, Dynamic intrinsic oxygen in shape-selected nanoceria: Quantifying the impact of Ce³⁺, surface and lattice oxygen that activates NO_x catalysis (submitted to *Nature Materials*)

L. McCullough, **D. Childers**, R. Watson, B. Kilos, D. Barton, E. Weitz, H. Kung, J. Notestein, Acceptorless dehydrogenative coupling of neat alcohols using Group VI sulfide catalysts (submitted)

CONFERENCE PRESENTATIONS

D. Childers, N. Schweitzer, S. Shahari, R. Rioux, J. Miller, R. Meyer, Modifying Structure Sensitive Reactions by Addition of Zn to Pd. 2014 Catalysis Club of Chicago Spring Symposium, Naperville, Illinois, May 2014

D. Childers, N. Schweitzer, J. Miller, R. Meyer, Intermetallic Catalysts: Addition of Zn to Pd as a Deterrent for Hydrogenolysis, 2013 AIChE Annual Meeting, San Francisco, California, November 2013

D. Childers, A. Saha, N. Schweitzer, R. Rioux, J. Miller, R. Meyer, Neopentane Hydrogenolysis over Supported Pd and Pt Catalysts: A Kinetics of Particle Size, 23rd North American Catalysis Society Meeting, Louisville, Kentucky, June 2013

D. Childers, A. Saha, N. Schweitzer, R. Rioux, J. Miller, R. Meyer, Effect of Pt/Pd Particle Size and Alloying on Neopentane Hydrogenolysis Selectivity and Activity, Catalysis Club of Chicago Spring Symposium, Naperville, Illinois, May 2013 (Poster)

D. Childers, T. Wu, J. Miller, R. Meyer, Effect of Pt/Pd Particle Size on Neopentane Hydrogenolysis Selectivity and Activity, Gordon Research Conference: Catalysis, New London, New Hampshire, June 2012 (Poster)

GRANTS AND AWARDS

Kokes Award, North American Catalysis Society Meeting, 2013

Landes Prize for Technical Communication, University of Michigan, Department of Chemical Engineering, 2009

Dean's List, University of Michigan, College of Engineering, 2009

Richard and Willogene Rice Scholarship, University of Michigan, Department of Chemical Engineering, 2009

Rogel Scholar, University of Michigan, 2005-2009

ACTIVITIES

UIC Graduate Student Council
Department Representative 2011

Catalysis Club of Chicago Secretary May 2015-present

- Coordinate monthly meetings for 30-50 professionals at various locations around Chicago and the spring symposium for 120+ people
- Determine list of speakers for the monthly meetings from both academia and industry with a wide range of research applications