DANIEL DAVIES

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YouTube channel | Google Scholar

EDUCATION

University of Illinois, 2016 – 2022
PH.D. CHEMICAL ENGINEERING
LAB SAFETY OFFICER 2018-2020

University of Iowa, 2012 – 2016
B.S. CHEMICAL ENGINEERING
WITH HONORS AND HIGH DISTINCTION
MINORS: CHEMISTRY, MATHEMATICS, PHYSICS

SKILLS AND TECHNIQUES

- Grazing Incidence X-ray Diffraction
- In Situ Polarized Microscopy
- Raman Spectroscopy
- OFET Device Measurements
- Single Crystal X-ray Diffraction
- Crystal Growth Techniques
- Thin Film Solution Printing
- EPR spectroscopy
- Python
- MATLAB

RESEARCH EXPERIENCE

Postdoctoral Researcher University of Texas at Austin, Dr. Delia Milliron
SUMMER 2022 – PRESENT

Graduate Research Assistant University of Illinois at Urbana Champaign, Dr. Ying Diao
FALL 2016 - MAY 2022
"Molecular Origins Of Polymorphic Phase Transitions For Dynamic Organic Electronics"

SULI Research Assistant Argonne National Laboratory, Dr. Steve Kuhlman
SUMMER 2016
"Ring Resonators for Astrophysics"

Undergraduate Research Assistant University of Iowa, Dr. Amanda Haes
FALL 2015 – SPRING 2016
"Core-Shell Nanoparticles for SERS Detection of Small Molecules"

SULI Research Assistant Brookhaven National Laboratory, Dr. Stanislaus Wong
SUMMER 2015
"Formation of zinc oxide nanowires via hydrothermal processes for nanowire-quantum dot heterostructures"

AWARDS AND HONORS

SCS Science Image Challenge Finalist
University of Illinois Urbana-Champaign School of Chemical Sciences Fall 2021

DuPont Science & Engineering Fellowship
University of Illinois, Urbana-Champaign ChBE department, Fall 2021

Best Poster Award, Organic Electronics Symposium
MRS, Spring 2021

A. T. Widiger Chemical Engineering Fellowship
University of Illinois, Urbana-Champaign ChBE department, Summer 2021

Graduate College Conference Participation Award
University of Illinois, Urbana-Champaign ChBE department, 2021

Selected for AIChE Graduate Student Award Symposium: Electronic and Photonic Materials
AIChE, 2020

GRC Travel Award
Gordon Research Conference, 2019

Parr Fellowship
University of Illinois, Urbana-Champaign ChBE department, 2016

Alumni of the Year Award
Future Cities National Competition, 2016

PRESENTATIONS

Virtual Midwest Organic Solid-State Chemistry Symposium 2021
"Controlling Polymorphic Phase Transitions Via Alkyl Chain Engineering"

Virtual Symposium on Solid-State Organic Chemistry 2021
"Direct Control of Cooperative Structural Transitions via Alkyl Chain Modification"

MRS Symposium: Electronics and Optics 2021
"Dynamic Modulation of Charge Transport Properties Enabled by Cooperative Structural Transitions"

AIChE Graduate Student Award Symposium: Electronic and Photonic Materials 2020
"Understanding Polymorphic Transition Mechanisms of n-Type Organic Semiconductors"

Virtual Symposium on Solid-State Organic Chemistry 2020
"Understanding the Origins of Polymorphic Transition Mechanisms in an N-type Organic Semiconductor"

Gordon Research Conference Nucleation and Growth (selected short talk) 2019
"Understanding the Origins of Polymorphic Transition Mechanisms in Quinoidal Terthiophenes for Tailoring Novel Optical and Electronic Functionality in Organic Semiconductors"

Gordon Research Seminar associated with the Nucleation and Growth Conference 2019
"Understanding the Origins of Polymorphic Transition Mechanisms in Quinoidal Terthiophenes for Tailoring Novel Optical and Electronic Functionality in Organic Semiconductors"

Midwest Thermodynamics and Statistical Mechanics 2019
"Understanding the Polymorphic Transition Mechanisms of n-Type Organic Semiconductors"

TEACHING EXPERIENCE

Momentum and Heat Transfer (Discussion)Fall 2019
Unit Operations Laboratory (Lab) Spring 2019
Mass Transfer Operations (Discussion) Spring 2018
Process Safety (Discussion and Lab) Spring 2016
Eng. Flow and Heat Exchange (Discussion) Fall 2015
Materials Science (Lab) Spring 2015
Eng. Fund. III: Thermodynamics (Discussion) Fall 2014

PUBLICATIONS

Davies, D.W.; Park, S.K.; Kafle, P.; Chung, H.; Yuan, D., Strzalka, J.; Mannsfeld, S.; Grass, S.; Chen, Y.; Gray, D.; Zhu, X.; Diao, Y.; "Radically Tunable n-Type Organic Semiconductor via Polymorph Control", *Chemistry of Materials,* **2021**, 33, 7, 2466−2477. https://doi.org/10.1021/acs.chemmater.0c04678

Davies, D.W.; Park, S.K.; Chung, H.; Yuan, D.; Weber, R.; Zhu, X.; Diao, Y.; "A Tale of Two Transitions: Unraveling Two Distinct Polymorph Transition Mechanisms in One n-Type Single Crystal for Dynamic Electronics", **Under Review**
Preprint: https://doi.org/10.26434/chemrxiv-2021-9xghl

Davies, D.W.; Graziano, G.; Park, S.K.; Chung, H.; Yuan, D.; Grass, S.; Chen, Y.; Gray, D.; Zhu, X.; Diao, Y.; "Modulating Both Cooperative and Non-Cooperative Polymorph Transitions via Tuning Alkyl Side Length of a High-Performance n-Type Organic Semiconductor.", **Under Review**

Davies, D.W.; Graziano, G.; Park, S.K.; Chung, H.; Wuyue, L.; Zhu, X.; Diao, Y.; "Direct Laser Writing of Reconfigurable and Neuromorphic Devices Via Polymorphic Transition", **in preparation**

Xia, P.; **Davies, D.W**.; Patel, B.B.; Qin M.; Liang, Z.; Graham K.R.; Diao, Y.; Tang, M.L "Spin-Coated Fluorinated PdS QD Superlattice Thin Film with High Hole Mobility", *Nanoscale*, **2020**, 12, 11174-11181. https://doi.org/10.1039/D0NR02299C

Campillo-Alvarado, G.; Bernhardt, M.; **Davies, D.W**.; Soares, J.; Woods, T.; Diao, Y.; "Modulation of π-Stacking Modes and Photophysical Properties of an Organic Semiconductor Through Isosteric Cocrystallization", **2021**, J. Chem. Phys., 155, 071102. https://doi.org/10.1063/5.0059770
- Selected for the 2021 JCP Emerging Investigators Special Collection

Campillo-Alvarado, G.; Liu, R.; **Davies, D.W**.; Diao, Y.; "Enhancing Single-Crystal Dichroism of an Asymmetric Azo Chromophore by Perfluorophenyl Embraces and Boron Coordination", *Cryst. Growth Des.*, **2021,** 21, 6, 3143−3147. https://doi.org/10.1021/acs.cgd.1c00114

- Highlighted on journal cover, 06/02/2021, https://pubs.acs.org/toc/cgdefu/21/6

Kafle, P.; Sanghavi, R.; Punjani, S.; **Davies, D.W.**; Diao, Y. "Drastic Modulation of Molecular Packing and Intrinsic Dissolution Rate by Meniscus-Guided Coating of Extremely Confined Pharmaceutical Thin Films", ACS Appl. Mater. Interfaces **2021,** 13, 47, 56519−56529. https://doi.org/10.1021/acsami.1c08398

Park, S.K.*; Sun, H.*; Chung, H.; Patel, B.B.; Zhang, F.; **Davies, D.W.**; Zhao, K.*; Diao, Y.* "Super- and Ferro-elastic Organic Semiconductors for Ultraflexible Single Crystal Electronics", *Angewandte Chemie International Edition*, **2020**, 59, 31, 13004-13012. https://doi.org/10.1002/anie.202004083

- Highlighted by Beckman Institute News, EurekAlert!, Science Daily, Phys.org, etc. "Designing flexible and stretchable single crystal electronic systems" 05/13/2020
- Featured by Materials Today, "Organic crystal could stretch to electronics applications" 05/26/2020
- Selected as a "Hot Paper" by the Angewandte Chemie editors

Bischak, C. G.; Flagg, L.Q.; Yan, K.; Rehman, T.; **Davies, D.W**.; Quezada, R.J.; Onorato, J.W.; Luscombe, C.K.; Diao, Y.; Li, C.-Z.; Ginger, D.S. "A Reversible Structural Phase Transition by Electrochemical Ion Injection into a Conjugated Polymer", *Journal of the American Chemical Society*, **2020**, 142, 16, 7434–7442. https://doi.org/10.1021/jacs.9b12769

Chung, H.; Chen, S.; Sengar, N.; **Davies, D.W.**; Garbay, G.; Geerts, Y.H.; Clancy, P.; Diao, Y. "Single Atom Substitution Alters Polymorphic Transition Mechanism in Organic Electronic Crystals", *Chemistry of Materials*, **2019**, 31, 21, 9115-9126. https://doi.org/10.1021/acs.chemmater.9b03436.