

## Lars C. Grabow

Member, Texas Center for Superconductivity at the University of Houston

### RESEARCH INTERESTS

Superconductivity: synthesis and characterizations of new superconductors; High performance thermoelectric materials: nanostructure approach to reduce thermal conductivity and to improve thermoelectric properties for waste heat conversion into electricity; Catalysts for water splitting: synthesis and testing of efficient catalysts for hydrogen and oxygen evolution reactions; Nanosheets for enhanced oil recovery: synthesis and characterizations of high performance nanosheet for enhanced oil recovery; Thermal management: efficient cooling materials, thermal storage, high thermal conductivity; Flexible transparent electrodes: fabrication and understanding of flexible transparent electrodes; etc.

### EDUCATION

University of Stuttgart, Germany	Chemical Engineering	Dipl.-Ing., 2003
University of Wisconsin, Madison	Chemical and Biological Engineering	Ph.D., 2008

### SELECTED HONORS/AWARDS

ACS-PRF Doctoral New Investigator Award	2012
Teaching Excellence Award, Cullen College of Engineering, UH	2014
Best Fundamental Paper Award from the AIChE South Texas Section	2014
U.S. Department of Energy Early Career Award	2014
NSF CAREER Award	2015
Junior Faculty Research Excellence Award, Cullen College of Engineering, UH	2015
Excellence in Research, Scholarship or Creative Activity of UH (Assistant Professor)	2017
Best Fundamental Paper Award from the AIChE South Texas Section	2017

### PROFESSIONAL ACTIVITIES

Chair/Vice-Chair: "AIChE Catalysis and Reaction Engineering Division"	2016-present
Chair/Vice-Chair/Secretary/Director: "Southwest Catalysis Society"	2014-present
Editorial Board: "Surface Science"	2019-present
International Advisory Board: "ChemCatChem"	2017-present
Member: "Scientific Committee for NASCRE-4"	2017 - 2019

### EXPERIENCE

Associate Professor	Chemical Engineering	University of Houston	2017-present
Associate Professor (by courtesy)	Chemistry	University of Houston	2017-present
Assistant Professor (by courtesy)	Chemistry	University of Houston	2014-2017
Assistant Professor	Chemical Engineering	University of Houston	2011-2017
Physical Science Research Associate	Chemical Engineering	Stanford University	2010-2011
Postdoctoral Fellow	Center for Atomic-scale Materials Design at DTU		2008-2010

### FIVE MOST RELEVANT PUBLICATIONS:

1. "Stabilizing the Interface between Sodium Metal Anode and Sulfide-Based Solid-State Electrolyte with an Electron-Blocking Interlayer", P. Hu, Y. Zhang, X. Chi, K. Kumar Rao, F. Hao, H. Dong, F. Guo, Y. Ren, L. C. Grabow, and Y. Yao, *ACS Appl. Mater. Interfaces* 2019, DOI:10.1021/acsami.8b19984.
2. "Effects of Catalyst Phase on the Hydrogen Evolution Reaction of Water Splitting: Preparation of Phase-Pure Films of FeP, Fe<sub>2</sub>P, and Fe<sub>3</sub>P and Their Relative Catalytic Activities", D. E. Schipper, Z. Zhao, H. Thirumalai, A. P. Leitner, S. L. Donaldson, A. Kumar, F. Qin, Z. Wang, L. C. Grabow, J. Bao, and K. H. Whitmire, *Chem. Mater.* 2018, 30, 3588-3598.

3. "Vertically Aligned MoS<sub>2</sub>/Mo<sub>2</sub>C hybrid Nanosheets Grown on Carbon Paper for Efficient Electrocatalytic Hydrogen Evolution", Z. Zhao, F. Qin, S. Kasiraju, L. Xie, M. K. Alam, S. Chen, D. Wang, Z. Ren, Z. Wang, L. C. Grabow, and J. Bao, *ACS Catal.* 2017, 7, 7312-7318.
4. "Bifunctional metal phosphide FeMnP films from single source metal organic chemical vapor deposition for efficient overall water splitting", Z. Zhao, D. E. Schipper, A. P. Leitner, H. Thirumalai, J.-H. Chen, L. Xie, F. Qin, M. K. Alam, L. C. Grabow, S. Chen, D. Wang, Z. Ren, Z. Wang, K. H. Whitmire, and J. Bao, *Nano Energy* 2017, 39, 444-453.
5. "Interlayer-Expanded Molybdenum Disulfide Nanocomposites for Electrochemical Magnesium Storage", Y. Liang, H. D. Yoo, Y. Li, J. Shuai, H. Calderon-Benavides, F. C. Robles Hernandez, L. C. Grabow, and Y. Yao, *Nano Lett.* 2015, 15, 2194-2202.

For a full list of publication please see: <http://grabow.chee.uh.edu/> or <https://scholar.google.com/citations?user=IEii1qQAAAAJ&hl=en&oi=ao>

## Lars Grabow

### Research

Lars Grabow's technical expertise is the application of density functional theory (DFT) simulations, kinetic modeling, and descriptor-based computational screening to a variety of problems in heterogeneous catalysis and material science, such as environmentally benign energy conversion, energy storage, production of useful chemicals, green synthesis and pollution abatement. His approach to research emphasizes collaborations with experimental groups to bridge the material gap between theory and practice. While high-performance computation enables us to study reactions on well-defined model systems, the full complexity of a problem can rarely be captured. In contrast, atomic-scale information is hardly available in practice when real processes are studied. Thus, the marriage between theory and experiment is the most promising path to maximize knowledge gain and advance our understanding of functional materials. Dr. Grabow and his colleagues at TcSUH have successfully demonstrated this synergy to advance material discoveries for electrocatalytic water splitting and novel battery technologies.