



Adam Paul Karcz

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MATERIALS SCIENTIST AND CHEMICAL ENGINEER

Innovative, analytical **chemical engineer** and **materials scientist** focusing on integration of computational chemistry with process engineering and on structure-property relationships of materials, through successfully combining state-of-the-art **characterization** techniques with **quantum chemistry** and **process design**, implementing them into an atom-to-enterprise methodology. Drives cross-functional team collaboration and established a record of **novel design approaches**, securing several U.S. Small Business Innovation Research (SBIR) contracts for R&D in composites, coatings, and nanotechnology applications.

PROFESSIONAL EXPERIENCE

THE UNIVERSITY OF CALGARY ■ CALGARY, AB, CANADA

2021 to Present

Postdoctoral Researcher

ENERGY AND ENVIRONMENT RESEARCH GROUP

Computational understandings of the catalytic processes of CO₂ capture and storage occurring during chemical looping combustion of the tri-reforming of methane.

TECHNICAL UNIVERSITY OF DENMARK ■ KGS. LYNGBY, DENMARK

2019 to 2021

Postdoctoral Researcher

NEWREDCAT (2020 – 2021)

Catalytic testing of cyclic redox reactions for carbon deposition and gasification in reversible solid oxide cells, colloquially termed, “the carbon battery.”

OFFSHORE GAS SWEETENING VIA CATALYTIC H₂S REMOVAL (2019 – 2020)

Implemented a framework for intensifying a sulfur capture and conversion process through integration of computational chemistry for thermodynamic properties with process simulations of a two-phase system.

TECHNICAL UNIVERSITY OF DENMARK ■ KGS. LYNGBY, DENMARK

2016 to 2019

PhD Candidacy

SURFACE CHARACTERIZATION OF ACTIVATED CHALCOPYTE PARTICLES

Determined the role of chemical activation in the increased kinetics of copper extraction during mineral leaching using electron microscopy, spectroscopy, and quantum mechanical methods to understand the phenomena and to make predictions.

NEI CORPORATION ■ SOMERSET, NJ, U.S.A.

2011 to 2015

Produce Development Engineer

POLYMERS/COMPOSITES GROUP

Collaborated with design team to conceive and create innovative product concepts and provide production support. Produced complex design work for the U.S. Departments of Defense, NASA, and Disney Research proposals.

EDUCATIONAL DEGREES

TECHNICAL UNIVERSITY OF DENMARK ■ KGS. LYNGBY, DENMARK **2016 to 2019**

Doctor of Philosophy (Ph.D.) in Chemical & Biochemical Engineering GPA: 10.8 out of 12

UNIVERSITY OF MARYLAND ■ COLLEGE PARK, MD, U.S.A. **2007 to 2011**

Master of Science (M.S.) in Materials Science & Engineering GPA: 3.8 out of 4.0

RUTGERS UNIVERSITY ■ PISCATAWAY, NJ, U.S.A. **2003 to 2007**

Bachelor of Science (B.S.) in Ceramic & Materials Engineering GPA: 3.6 out of 4.0

TEACHING

- Separation Processes (MSc., Technical University of Denmark) – Lecture and Teaching Assistant
 - Lecturer: Jens Abdilskov (Fall 2019)
 - Lecturer: Jens Abdilskov (Fall 2020)
- Process Design (Diplom, Technical University of Denmark) – Teaching Assistant (Fall 2016 – Spring 2018)
 - Lecturer: Gurkan Sin (Spring 2020)
- Process Design (Diplom, Technical University of Denmark) – Teaching Assistant (Fall 2016 – Spring 2020)
 - Lecturer: Seyed Soheil Mansouri (Spring 2020)
 - Lecturer: Seyed Soheil Mansouri (Spring 2018)
 - Lecturer: Xiaodong Liang (Fall 2017)
 - Lecturer: Ioannis V. Skiadas (Spring 2017)
 - Lecturer: Xiaodong Liang (Fall 2016)

SUPERVISION

- Nima Nazemzadeh (PhD), An integrated multi-scale framework for bioprocess design, control and analysis (2020)
- Abhimanyu Pudi (PhD), Integration of process systems engineering and computational chemistry for process intensification (2020)
- Lisa Rønning Boye-Møller (BSc), Oxidative leaching of chalcopyrite particles. Optimization of laboratory-scale experiments (2018)
- Flavien Pierre Henri Tetard (MSc), Oxidative leaching of chalcopyrite particles. Experimental investigations and modelling aspects (2018)
- Mathias Boe Rysgaard (BSc), Oxidative leaching of chalcopyrite: Leaching dynamics and experimental constraints (2017)
- Signe Kathrine Meelby (MSc), Reductive activation of chalcopyrite particles (2017)

PUBLICATIONS

- [Chemically modified hydrate swapping and hydrate stability during multistage CO₂-N₂ injection schemes](#) 2021
JS Pandey, S Khan, AP Karcz, N von Solms, Fuel 299, 120711
- [Towards a Rational, Quantum-Chemistry-Based Selection and Screening of Green Solvents for Liquid-Liquid Phase Transfer Catalysis](#) 2021
A Pudi, AP Karcz, R Dickson, S Zhang, SS Mansouri, MP Andersson, Computer Aided Chemical Engineering 50, 1593-1598
- [The Role of Surfactants in Gas Hydrate Management](#) 2021
JS Pandey, AP Karcz, N von Solms, Surfactants in Upstream E&P, 403-440
- [Molecular tracking: A concept for side-draw distillation column design](#) 2021
N Nazemzadeh, IA Udugama, AP Karcz, MP Andersson, J Abildskov, SS Mansouri, AIChE Journal 67 (1), e17070
- [Methane Hydrate Formation Behavior in the Presence of Selected Amino Acids](#) 2020
JS Pandey, YJ Daas, AP Karcz, N von Solms, Journal of Physics: Conference Series 1580 (1), 012003
- [Enhanced Hydrate-Based Geological CO₂ Capture and Sequestration as a Mitigation Strategy to Address Climate Change](#) 2020
JS Pandey, YJ Daas, AP Karcz, N Von Solms, Energies 13 (21), 5661
- [Modeling of Liquid-Liquid Phase Transfer Catalysis: Process Intensification via Integration of Process Systems Engineering and Computational Chemistry](#) 2020
A Pudi, AP Karcz, V Shadravan, MP Andersson, SS Mansouri, Computer Aided Chemical Engineering 48, 43-48
- [Enhanced CH₄-CO₂ Hydrate Swapping in the Presence of Low Dosage Methanol](#) 2020
JS Pandey, C Karantonidis, AP Karcz, N von Solms, Energies 13 (20), 5238
- [Characterization of elemental sulfur in chalcopyrite leach residues using simultaneous thermal analysis](#) 2019
C Lv, H Wu, W Lin, JB Illerup, AP Karcz, S Ye, AJ Damø, Hydrometallurgy 188, 22-30
- [Electron microscope investigations of activated chalcopyrite particles via the FLSmidth® ROL process](#) 2017
AP Karcz, AJ Damø, JB Illerup, S Rocks, K Dam-Johansen, D Chaiko, Journal of Materials Science 52 (20), 12044-12053
- [Direct observation of dynamic mechanical regulation of DNA condensation by environmental stimuli](#) 2014
A Lee, A Karcz, R Akman, T Zheng, S Kwon, ST Chou, S Sucayan, LJ Tricoli, JM Hustedt, Q Leng, JD Khan, AJ Mixon, J Seog, Angewandte Chemie 126 (40), 10807-10811
- [High Performance Fluoroelastomer Nanocomposite Seals for Geothermal Submersible Pumps](#) 2013
DE Eberly, R Ou, G Skandan, A Karcz, NASA Tech Briefs, May 2013
- [Self-Healing Nanocomposites for Reusable Composite Cryotanks](#) 2013
D Eberly, R Ou, A Karcz, G Skandan, NASA Tech Briefs, May 2013
- [Multi-Scale CNT-Based Reinforcing Polymer Matrix Composites for Lightweight Structures](#) 2013
D Eberly, R Ou, A Karcz, G Skandan, P Mather, E Rodriguez, NASA Tech Briefs, May 2013

PRESENTATIONS

- AICHE Annual Meeting 2019, Orlando, Florida (Two Oral Presentations)
- Venture Cup Denmark 2019, Idea Competition, Odense, Denmark (Oral Pitch Presentation)
- Materials Science & Technology 2018, Columbus, OH, U.S.A. (Poster Presentation)
- Extraction 2018, Ottawa, ON, Canada (Oral Presentation)
- E-MRS Fall Meeting 2018, Warsaw, Poland (Oral Presentation)
- COMDI 2018, Lausanne, Switzerland (Poster Presentation)
- SLIMAIA 2018, Rueil-Malmaison, France (Poster Presentation)
- Materials Science & Technology 2017, Pittsburg, PA, U.S.A. (Oral Presentation)
- Materials Science & Technology 2016, Salt Lake City, UT, U.S.A. (Oral Presentation)
- 1st Annual Conference on the International Space Station, 2012, Denver, CO, U.S.A. (Poster Presentation)
- Cancer Nanobiotechnology Think Tank, 2011, Frederick, MD, U.S.A. (Oral Presentation)
- ResearchFest 2011, College Park, MD, U.S.A. (Oral Presentation)
- Southern Biomedical Engineering Conference 2010, College Park, MD, U.S.A. (Oral Presentation)
- Fischell Festival 2010, College Park, MD, U.S.A. (Poster Presentation)
- ResearchFest 2010, College Park, MD, U.S.A. (Poster Presentation)

KEY STRENGTHS

Product Development ■ Research & Development ■ Cross-Functional Team Collaboration
Market Strategy ■ Feasibility Analysis ■ Project Planning & Risk Mitigation ■ Production Start-Up
Characterization ■ Pro/ENGINEER ■ Pro/II ■ Efficient Prototyping ■ Coating Formulation
Hydrometallurgy ■ Plastic Extrusion ■ Electrospinning ■ Strength of Materials ■ Modeling
Polymer Matrix Composites ■ Self-healing Composites ■ Density Functional Theory

AFFILIATIONS

- Keramos Honors Society (member, 2004-present)
- RLC the Core (RPM music director, DJ, 2005-2007)
- American Ceramic Society (member, 2006-2021)
- The Materials, Mining, and Metallurgy Society member (member, 2006-2021)
- European Materials Research Society member (member, 2016-2021)
- DTU PhD Association (board member, PAND representative, 2019-2020)
- DTU PhD Association (chair, 2020-2021)
- PhD Association Network of Denmark (board member, 2019-2020)
- American Institute of Chemical Engineers (member, 2019-2020)

AWARDS

- Otto Mønstedts Fund, Award #19-81-1431 (2019)
- Finalist in the Idea Competition for Venture Cup Denmark with team GasTech (2019)
- 2nd place Graduate Student Award for Masters Research for University of Maryland, College Park (2010)
- 1st place Graduate Student Award for Masters Research in the Department of Materials Science and Engineering at the University of Maryland, College Park (2010)
- Materials Science and Engineering Graduate Student Fellowship (Fall 2007-Spring 2008)
- Leadership Award from RLC Radio Station (2007)
- Ceramic and Materials Engineering Student Grant (2006)

LANGUAGES

English (native) ■ Polish (native) ■ Danish (basic)

PERSONAL

Date of Birth: January 25th, 1985

Place of Birth: Passaic, NJ, U.S.A.

Citizenship: United States and Poland