Exponent®
Engineering & Scientific Consulting

Amanda Filie, Ph.D., P.E.

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Professional Profile

Dr. Filie employs her expertise in chemical engineering and materials science to understand and solve complex problems in a variety of industries, including chemical, automotive, renewable energy, industrial processing and energy utilities. She leverages experience in these areas to assist clients with challenges across product and process stages, including product development, life cycle assessments (LCA), and failure analysis.

Dr. Filie has a deep understanding of catalysts and catalytic processes applicable to industrial chemical manufacturing, value-added chemicals derived from biomass, abatement of automotive emissions, and electrochemical fuel cells. In the investigation of matters regarding catalyst performance, durability, fouling and failure, Dr. Filie performs advanced characterization of nanoscale materials using electron microscopy and X-ray spectroscopic methods. She is also trained in performing LCA for greenhouse gas (GHG) emissions. She has utilized these skills in support of both proactive work and product liability, patent, and international arbitration litigation matters.

Prior to joining Exponent, Dr. Filie conducted research in heterogeneous catalysis during her doctoral studies at Harvard University. Her dissertation focused on the catalytic performance of dilute palladium-in-gold nanoparticles supported on silica for oxidation catalysis. She designed and executed the testing of catalyst materials in gas-phase flow reactors and accrued experience using transmission electron microscopy (TEM), scanning electron microscopy (SEM), energy-dispersive X-ray spectroscopy (EDS/EDX), and X-ray photoelectron spectroscopy (XPS). While at Harvard, she also developed and taught “Systems Thinking and Design to Address Human Challenges,” teaching students tools to analyze the interactions between elements of a system and facilitating their application to current societal challenges.

Prior to her graduate studies, Dr. Filie held an internship in the chemical company Badische Anilin und Sodafabrik (BASF) leading design meetings and overseeing project execution for a wastewater management project and electrical grounding project. She also held research assistantships in heterogeneous catalysis working with zeolite materials for biomass decomposition and supported silver nanoparticles for ethylene epoxidation.

Academic Credentials & Professional Honors

Ph.D., Engineering Sciences, Harvard University, 2021

M.S., Engineering Sciences, Harvard University, 2019

B.S., Chemical Engineering, University of Maryland, College Park, 2016

National Science Foundation Graduate Research Fellowship, 2016 – 2021

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Licenses and Certifications

Professional Engineer Chemical, California, #7136

Life Cycle Assessment: Quantifying Environmental Impacts from Massachusetts Institute of Technology for Professional Education

Prior Experience

Researcher, Harvard University, 2017 – 2021

Researcher, University of Maryland at College Park, 2013 – 2015

Intern Engineer, Badische Anilin und Sodafabrik (BASF), Summer 2015

Researcher, University of Colorado at Boulder, Summer 2014

Co-Instructor, Systems Thinking and Design to Address Human Challenges, Harvard Extension School, Spring 2020

Teaching Fellow, Energy and Climate: Vision for the Future, Harvard University, Spring 2018

Teaching Fellow, Chemical and Biomolecular Separation Processes, University of Maryland at College Park, Spring 2016

Teaching Fellow, Chemical Kinetics and Reactor Design, University of Maryland at College Park, Fall 2015

Professional Affiliations

American Institute of Chemical Engineers (AIChE)

Society of Women Engineers (SWE)

Languages

Italian

Spanish

Portuguese

Publications

James J, Filie A, Wechsung A, Morrison AM, Harrington R, Diez S, Engebretson N, O'Sullivan E. Assessing the environmental impacts of reusability and the starship space transportation system. Proceedings of the 76th International Astronautical Congress, September 2025.

Filie A, Wechsung A., James J, Morrison AM. Counting your C's: opportunities and risks associated with carbon credits. Proceedings of the 2025 American Institute of Chemical Engineers Spring Meeting April 2025.

Lee J*, Filie A*, Wilson L, Nguyen K, et al. Selective oxidation of linear alcohols: the promotional effect of water and inhibiting effect of carboxylates over dilute PdAu catalysts. J. Mater. Chem. A. 2024;

12:13778–13791.

Foucher AC, Ngan HT, Shirman T, Filie A, et al. Influence of Pd concentration in Au — Pd nanoparticles for the hydrogenation of alkynes. ACS Appl. Nano Mater. 2023; 6(24):22927–22938.

Filie A, Shirman T, Foucher AC, Stach EA, Aizenberg M, Aizenberg J, Friend CM, Madix RJ. Dilute Pd-in-Au alloy RCT-SiO□ catalysts for enhanced oxidative methanol coupling . Journal of Catalysis 2021; 404:943–953.

Filie A, Shirman T, Aizenberg M, Aizenberg J, Friend CM, Madix RJ. The dynamic behavior of dilute metallic alloy $Pd_xAu_{□□x}$/SiO□ raspberry colloid templated catalysts under CO oxidation. Catalysis Science & Technology 2021; 11:4072–4082.

Luneau M, Shirman T, Filie A, Timoshenko J, Chen W, Trimpalis A, Flytzani-Stephanopoulos M, Kaxiras E, Frenkel AI, Aizenberg J, Friend CM, Madix RJ. Dilute Pd/Au alloy nanoparticles embedded in colloid-templated porous SiO□: stable Au-based oxidation catalysts. Chemistry of Materials 2019; 31:5759–5768.

Oh SC, Nguyendo T, He Y, Filie A, Wu Y, Tran DT, Lee IC, Liu D. External surface and pore mouth catalysis in hydrolysis of inulin over zeolites with different micropore topologies and mesoporosities. Catalysis Science & Technology 2017; 7:1153–1166.

Presentations

Filie A, Wechsung A, James J, Morrison AM. Counting your C's: opportunities and risks associated with carbon credits. Presented at the 2025 American Institute of Chemical Engineers Spring Meeting, April 2025, accepted.

Filie A, Shirman T, Foucher AC, Stach EA, Aizenberg M, Aizenberg J, Friend CM, Madix RJ. Dilute Pd-in-Au alloy RCT-SiO□ catalysts for enhanced oxidative methanol coupling. Presented at the 2021 Energy Frontier Research Centers Energy Innovation Hubs Computational Materials and Chemical Sciences Projects Principal Investigators' Virtual Meeting, October 2021.

Filie A, Shirman T, Foucher AC, Stach EA, Aizenberg M, Aizenberg J, Friend CM, Madix RJ. Oxidative methanol coupling over PdxAu1-x RCT-SiO□. Presented at the 2020 Virtual American Institute of Chemical Engineers Annual Meeting, November 2020.