



Exponent®
Engineering & Scientific Consulting

Margaret Clapham, Ph.D.

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Professional Profile

Margaret Clapham, Ph.D., is a trained chemist and analytical scientist with strong expertise in analysis of polymeric and organic materials. She assists clients in understanding complex materials performance issues by applying a range of both established and novel analytical techniques to material systems. She has experience with materials used in a variety of industries including semiconductor manufacturing, organic electronics, water purification, building materials, and medical devices.

Dr. Clapham has extensive experience investigating structure-property relationships of materials through analysis with Raman spectroscopy and microscopy, Fourier transform infrared spectroscopy (FTIR), thermo-gravimetric analysis (TGA), differential scanning calorimetry (DSC), powder and single crystal x-ray diffraction (PXRD/SCXRD). Her toolkit also includes nuclear magnetic resonance (NMR), gas chromatography (GC) and mass spectrometry (MS), computed tomography (CT) and scanning electron microscopy (SEM). She has additional expertise consulting in the area of volatiles analysis, particularly in coupled thermal & spectroscopic techniques, such as TGA-FTIR, TGA-GCMS, and pyrolysis-GCMS.

During her time at DuPont, Dr. Clapham developed and executed analytical methodologies related to failure analysis, root-cause investigations, raw material analysis, as well as safety and hazard analysis. Her analytical insights have supported all stages of product life cycle from R&D to scale-up and applications development.

Dr. Clapham earned her Ph.D. in chemistry from the University of Minnesota where she investigated molecular and solid-state structure effects on energetic properties of optoelectronic materials. Her research was highly cross-discipline, involving organic synthesis, crystallography, Raman spectroscopy development and computational chemistry.

Academic Credentials & Professional Honors

Ph.D., Chemistry, University of Minnesota, 2023

M.S., Chemistry, University of Minnesota, 2020

B.S., Chemistry, Drake University, 2018

SCGSR Fellowship, Department of Energy, 2022

Doctoral Dissertation Fellowship, University of Minnesota, 2022

Prior Experience

Senior Scientist, DuPont, Wilmington, 2023-2026

Professional Affiliations

American Chemical Society (member)

Society for Applied Spectroscopy (member)

Publications

Clapham ML, Das A, Douglas CJ, Frontiera RR. [Killer phonon caught: femtosecond stimulated Raman spectroscopy identifies phonon-induced control of photophysics in rubrene derivatives](#). J. Am. Chem. Soc. 2024; 146(29):19939.

Clapham ML, Frontiera RR, Douglas CJ. [Mixed rubrene cocrystals offer insights into intermolecular interactions influencing crystal packing](#). Cryst Growth Des. 2023; 23 (6):3942.

Clapham ML, Leighton RE, Douglas CJ, Frontiera RR. [Beyond single crystals: Imaging rubrene polymorphism across crystalline batches through lattice phonon Raman microscopy](#). Journal of Chemical Physics 2021; 155:234703.

Clapham ML, Murphy EC, Douglas CJ. [Synthesis and crystal engineering of rubrene and its derivatives](#). Synthesis 2021; 53:461–474.

Presentations

Clapham ML. Lattice phonon Raman spectroscopy as a tool to understand polymorphism in the organic semiconductor rubrene. Invited Talk, American Chemical Society Division of Energy and Fuels Virtual Student Seminar Series, 2022.

Clapham ML. Lattice phonon Raman spectroscopy as a tool to understand polymorphism in organic semiconductors. Oral presentation, American Chemical Society National Meeting, San Diego, CA, 2022.

Additional Education & Training

Six Sigma Green Belt, DuPont, 2025