

Exponent®
Engineering & Scientific Consulting

Chris Lyons, Ph.D.

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Professional Profile

Dr. Lyons' expertise lies at the intersection of chemistry and polymer science, including materials characterization, polymer failure analysis and fractography, and analysis of polymer formulations. He assists clients across a variety of industries, including healthcare, medical devices, construction materials and plumbing systems, consumer products and electronics, and automotive, in both proactive and reactive settings, including navigating product recalls, risk assessments, and materials characterization and selection during the product development process. Dr. Lyons specializes in chemical analysis and characterization of molecular systems and polymeric materials, including adhesives, elastomers, and rigid plastics, with emphasis on how material incompatibility can influence device failure.

Dr. Lyons is well versed in a variety of characterization methods including Fourier transform infrared (FTIR) spectroscopy, liquid and gas chromatography, (LC-MS, GC-MS), gel permeation chromatography (GPC), scanning electron microscopy (SEM), and energy dispersive X-ray spectroscopy (EDX), as well as numerous thermal and spectroscopic characterization methods. He also assists clients with polymer mechanical testing and failure recreation, accelerated aging studies, and extractables and leachables (E&L) analysis.

Dr. Lyons is an active member of the Society of Plastics Engineers and is serving as the current Chair of the Medical Plastics Division. Before joining Exponent, Dr. Lyons received his Ph.D. in chemistry from Stanford University where he was a fellow in the Center for Molecular Analysis and Design.

Academic Credentials & Professional Honors

Ph.D., Chemistry, Stanford University, 2016

B.S., Professional Chemistry, California State University, Chico, 2009

Chair, Society of Plastics Engineers Medical Plastics Division, 2026

Myer Ezrin Best Paper Award for the Failure Analysis & Prevention Special Interest Group, ANTEC, 2017.

Stanford University Center for Molecular Analysis and Design Fellow, 2013-2015

Outstanding Graduating Senior, Department of Chemistry California State University, Chico, May 2009

Professional Affiliations

American Chemical Society (member)

Society of Plastics Engineers

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Publications

Lyons CT, Ansari F, Siskey R, Donthu S, MacLean S. Environmental Stress Cracking Failure of Amorphous Polymer Materials, ANTEC, Detroit MI, 2019.

Lyons CT, Ansari F, Siskey R, Donthu S, MacLean S. Mechanical Characterization and Fractography of PC, ABS & PMMA: A Comparison of Tensile, Impact & ESC Fracture Surfaces, ANTEC, Anaheim CA, 2017.

Lyons CT, Stack TDP. Recent advances in phenoxyl radical complexes of salen-type ligands as mixed-valent galactose oxidase models. Coordination Chemistry Reviews 2013; 257:528.

Pratt RC, Lyons CT, Wasinger EC, Stack TDP. Electrochemical and spectroscopic effects of mixed substituents in bis(phenolate)-copper (ii) galactose oxidase model complexes. Journal of the American Chemical Society 2012; 134:7367.

Citek C, Lyons CT, Wasinger EC, Stack TDP. Self-assembly of the oxy-tyrosinase core and the fundamental components of phenolic hydroxylation. Nature Chemistry 2012; 4:317.

Herres-Pawlis S, Verma P, Haase R, Lyons CT, Wasinger EC, Flörke U, Henkel G, Stack TDP. Phenolate hydroxylation in a bis(μ-oxo)dicopper(iii) complex: Lessons from the guanidine/amine series. Journal of the American Chemical Society 2009; 131:1154.

Presentations

Lyons C. Ensuring Patient Safety with Chemical Analysis After Medical Device Recalls. MD&M West, Anaheim, CA, February 2025.

Lyons C, Klein R. Materials: Introduction & Trends in Medical Polymers. MD&M Minneapolis, Minneapolis, MN, October 2024.

Moll J, Fitzharris E, Liffland S, Lyons C. Medical Disinfecting Agents Induced Embrittlement in a Polycarbonate-Acrylonitrile Butadiene Styrene (PC-ABS) Resin. International Materials Applications & Technologies Conference and Exposition — IMAT, Cleveland, OH, October 2024.

Lyons C, Moll J, Lee C. Fractography of Amorphous Polymers — A Comparison of Tensile, Impact, and Environmental Stress Cracking Facture Surfaces. International Materials Applications & Technologies Conference and Exposition — IMAT, New Orleans, LA, September 2022

Lyons CT, Ansari F, Siskey R, Donthu S, MacLean S. Environmental Stress Cracking Failure of Amorphous Polymer Materials, ANTEC, Detroit MI, 2019.

Lyons CT, Ansari F, Siskey R, Donthu S, MacLean S. Environmental Stress Cracking (ESC) Failure of Amorphous Polymer Materials, Materials Science and Engineering Conference, Pittsburg PA, 2017.

Lyons CT. Thermodynamics and kinetics of CO2 capture on amine-functionalized mesoporous solids. Gordon Research Conference Poster, Carbon Capture and Sequestration, May 2015.

Lyons CT. Thermodynamics of CO2 capture on amine functionalized mesoporous solids. Invited Lecture, California State University, Chico Department of Chemistry and Biochemistry, April 2015.