Exponent
Failure Analysis Associates®

Exponent
149 Commonwealth Drive
Menlo Park, CA 94025

telephone 650-326-9400
facsimile 650-326-8072
www.exponent.com

Brian E. Ralston, Ph.D., P.E.

Senior Engineer

Professional Profile

Dr. Brian Ralston is a Senior Engineer in Exponent's Polymer Science and Materials Chemistry practice specializing in the selection, processing, and performance of polymeric materials, including plastics, adhesives, rubbers, films, and coatings. He consults on application-specific polymer selection based on design, manufacturability, material properties, chemical resistance, and performance specifications, and performs failure analyses related to polymer products. Dr. Ralston's experience also includes the formulation, processing, and characterization of thermoplastic, thermoset, and composite products made using extrusion, compounding, injection molding, compression molding, and thermoforming.

Dr. Ralston has performed fractography, mechanical property evaluation, thermal analysis, and chemical analysis on numerous polymeric components as part of root cause analyses and product development support. He has investigated issues related to photovoltaic (PV) cell plastics, medical device/ implant plastics and adhesives, halogen-free PVC replacement materials (e.g., TPEs), plastic pipes, fittings, and water filter housings, chemical resistance (e.g., environmental stress cracking (ESC)), and long-term failures due to creep and fatigue. He also has broad expertise related to biodegradable, bioabsorbable, and renewable plastics, such as PLA, soy protein and cornstarch plastics.

Dr. Ralston also has experience in the gas pipeline industry, including a year-long effort to assist a large gas utility company with implementation of a plan to validate the Maximum Allowable Operating Pressure (MAOP) for its gas transmission lines. Tasks included searching and organizing over two million records related to pipeline installation and repair, developing quality control (QC) methods, performing QC activities and training contractors to provide a uniform work product.

Prior to joining Exponent, Dr. Ralston performed failure analysis of plastic parts as a Plastic Consulting Engineer with The Madison Group. In addition, Dr. Ralston characterized plastic films and adhesives for Procter & Gamble.

Academic Credentials and Professional Honors

Ph.D., Mechanical Engineering, Minor: Industrial Engineering, University of Wisconsin-Madison, 2008
M.Eng., Polymer Engineering and Science, University of Wisconsin-Madison, 2006
M.S., Entomology, The Ohio State University, 2001
B.S., Entomology, The Ohio State University, 1998

3M Foundation Science and Technology Fellowship, 2005–2008
Distinguished Medalist National Merit Scholarship, 1994–1998

Licenses and Certifications

Registered Professional Mechanical Engineering, California, #M35415

Publications

Ralston BE, Donthu S, Ledwith P, Kramschuster A, McNulty J. Environmental stress cracking of polycarbonates exposed to sunscreen and hand lotion. Proceedings, Society of Plastics Engineers Annual Technical Conference (ANTEC), Orlando, FL, 2012 (accepted).

Clevenger JO, Ralston B. Rapid development. Medical Device Developments, October 2009.

Gramann PJ, Cruz JC, Ralston BE. Using differential scanning calorimetry to determine the quality of a PVC part. Proceedings, Society of Plastics Engineers Annual Technical Conference (ANTEC), Chicago, IL, 2009.

Ralston BE, Osswald TA. Viscosity of soy protein plastics determined by screw-driven capillary rheometry. Journal of Polymers and the Environment 2008; 16(3).

Ralston BE, Osswald TA. Mechanical properties and moisture sensitivity of virgin and recycled soy protein-cornstarch plastics. Proceedings, Society of Plastics Engineers Annual Technical Conference (ANTEC), Milwaukee, WI, pp. 1648–1652, May 4–8, 2008.

Ralston BE, Osswald TA. The history of tomorrow's materials: Protein-based biopolymers. Plastics Engineering, February 2008.

Ralston BE, Osswald TA. Viscosity of soy protein plastics as determined by screw-extrusion through a capillary die. Proceedings, Society of Plastics Engineers Annual Technical Conference (ANTEC), Vol. 3, pp. 1479–1483, 2006.

Ralston BE, Wochner N, Osswald TA. Effects of crosslinkers, glycerol, and processing temperature on properties of soy protein based plastics. Proceedings, Society of Plastics Engineers Global Plastics Environmental Conference (GPEC), February 28–March 2, 2006.

Ralston BE, Osswald TA. Formulation, processing and properties of compression molded soy protein based plastics: A review. Proceedings, Society of Plastics Engineers Global Plastics Environmental Conference (GPEC), pp. 209–217, February 23–25, 2005.

Ralston BE, Osswald TA. Sustainable polymers – From a glorious past to a bright future. Proceedings, Society of Plastics Engineers Annual Technical Conference (ANTEC), pp. 3766–3770, May 16–20, 2004.

Selected Presentations

Ralston BE. Failure analysis of polymers in product design. Cabrillo College, Santa Cruz, CA, December 10, 2010.

Ralston BE. Failure analysis and bioplastics. University of Wisconsin-Stout, Menomonie, WI, February 23, 2009.

Hoffman JM, Ralston BE. Polymer failure analysis for medical devices, consumer electronics and consumer products. Society of Plastics Engineers Golden Gate Section monthly meeting, February 2009.

Ralston BE. Soy protein plastics: Material formulation, processing and properties. Society of Plastics Engineers (SPE) Golden Gate Section Annual Tech Fair, San Jose, CA, September 26, 2008.

Ralston BE. Soy protein plastics: Material formulation, processing and properties. BioEnvironmental Polymer Society (BEPS) International Symposium on Polymers and the Environment, Vancouver, WA, October 17-19, 2007.

Ralston BE. Natural fibers, bioplastics and biodegradable composites. N-Fiberbase Conference, Cologne, Germany, June 9–10, 2005.

Peer Reviewer

- *Society of Plastics Engineers Annual Technical Conference (ANTEC), Failure Analysis and Prevention Special Interest Group (FAPSIG)*
- *Journal of Biobased Materials and Bioenergy*
- *Society of Plastics Engineers 8th Annual Automotive Composites Conference & Exhibition (ACCE)*

Professional Affiliations

- BioEnvironmental Polymer Society—BEPS
- Society of Plastics Engineers—SPE
  – Director, Golden Gate Section, present term
  – Vice-President, University of Wisconsin-Madison student chapter, 2006–2008
- ASM International
  – Co-editor of ASM International self-study course, *Fundamentals of Non-Destructive Testing*

Testimony

John A. Kasel vs. Oak Tree Inn and Union Pacific Railroad Co., District Court of Scott's Bluff County, Nebraska, Case No. CI 10 14L, October 10, 2011 (deposition).