Exponent®
Engineering & Scientific Consulting

Evan Brown, Ph.D., P.E.

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Professional Profile

Dr. Brown's primary area of expertise is failure analysis in support of product development, in particular for the consumer electronics industry. He specializes in complex, multidisciplinary technical problems that span materials, mechanical, chemical, and optical root causes. He has extensive experience diagnosing failures in full consumer electronic systems, display modules, camera modules, PCBs, thin film stacks, housing enclosures, flexible cables, small-scale electronic elements, and a variety of electronics packaging. With well over a decade of experience, Dr. Brown has worked on hundreds of failure modes, such as materials fracture, corrosion of small-scale components, delamination, thin film mechanical failures, nano-/micro- scale fabrication process issues, active display element failures, and manufacturing process quality issues. As part of fracture analysis in brittle materials, such as glass and both single-crystal and polycrystalline ceramics, Dr. Brown routinely performs analyses of stress-at-failure, fracture origin identification, and assessment of the cause of fracture.

Prior to joining Exponent, he was a Graduate Research Assistant in the Solid Ionics and Electroceramics group at Caltech, where he received his doctoral degree in 2011. His thesis work revolved around the synthesis and testing of various electrode and electrolyte structures for use in Solid Oxide Fuel Cells (SOFCs). This included the fabrication of ceramic thin films, nanowires, and inverse opals, as well as metallic thin films and two-dimensional anti-dot networks. He is familiar with a wide range of thermal and chemical stability issues associated with fuel cell systems. Often to those ends, he has utilized techniques such as SEM, TEM, AFM, Raman spectroscopy, and XRD to describe functional SOFC materials and their associated microstructures.

Academic Credentials & Professional Honors

Ph.D., Materials Science, California Institute of Technology (Caltech), 2011

M.S., Materials Science, California Institute of Technology (Caltech), 2008

B.S., Materials Science, University of California, Irvine, 2006

Chancellor's Award for Excellence in Undergraduate Research, UC Irvine, 2006

The Henry Samueli School of Engineering Undergraduate Research Fellowship, UC Irvine, 2005

Integrated Micro/Nano Summer Undergraduate Research Experience Fellowship, UC Irvine, 2005

Licenses and Certifications

Professional Engineer Metallurgical, California, #1976

Prior Experience

Teaching Assistant, Caltech, 2009

Publications

Brown EC, Haile SM. Ceria-Based Structures for Solid Oxide Fuel Cells via Electrochemical Deposition. (in progress).

Brown EC, Wilke SK, Boyd DA, Goodwin DG, Haile SM. Polymer sphere lithography for solid oxide fuel cells: A route to functional, well-defined electrode structures. Journal of Materials Chemistry 2010; 20:2190-2196.

Fan Z, Dutta D, Chien C, Chen H, Brown EC, Chang P, Lu JG. Electrical and photoconductive properties of vertical ZnO nanowires in high density arrays. Applied Physics Letters 2006; 89:213110.

Presentations

Brown EC, Chueh W, Hao Y, Haile SM. Hierarchical ceria electrode structures for solid oxide fuel cells via electrochemical deposition. Electrochemical Society 218th Meeting, Las Vegas, NV, 2010.

Brown EC. Fuel cells for a sustainable energy future: Is there a role for nano-materials? Japan Science and Technology Agency Surveillance Project at California Institute of Technology, 2009.