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John C. McNulty, Ph.D., C.R.E.

Senior Manager

Professional Profile

Dr. John McNulty is a Senior Manager in Exponent's Materials and Corrosion Engineering practice. Dr. McNulty's areas of specialization include fracture mechanics and fatigue of materials (metals, glasses, ceramics, and composites), materials characterization techniques, mechanical testing, reliability testing and analysis (Telcordia, MIL-STD, and IPC/JEDEC standards), hybrid hermetic packaging (terrestrial and space), failure analysis of components and systems (biomedical implants, structural materials, MEMS, ceramic capacitors, lasers, detectors, and electronics), Pb-based and Pb-free printed circuit board assembly issues (solder selection and processing, temperature and moisture sensitive components, tin whiskers, and solderability platings), supplier intervention, corrective action development, and consumer product safety recalls. He has performed supplier reliability audits on behalf of domestic and foreign OEMs in the US, China, Japan, and Taiwan. He chairs the iNEMI working group on defining reliability requirements for implantable medical devices.

Prior to joining Exponent, Dr. McNulty consulted individually and as an employee of DfR Solutions (2007–2009). He provided engineering services with respect to product and process development, reliability, and failure analysis for clients in the telecommunications, defense (submarine, terrestrial, and space), industrial controls, test and measurement, commercial laser, biomedical, and consumer electronics/opto-electronics industries, and provided training on these services both on-site and at professional seminars and conferences.

Dr. McNulty was also employed in product development and reliability management roles for telecommunication component suppliers as well as a commercial laser component and system supplier (2000–2007). Products included optical switches, MEMS-based components (attenuators, dynamic gain & channel equalizers, tunable lasers, tunable filters & receivers), packaged and unpackaged laser diodes, and diode-pumped laser systems. In these positions, he was responsible for hybrid packaging development and qualification of devices with respect to industry and commercial standards, as well as management of failure analysis, corrective action development, and warranty/recall issues. He was a committee member for the revision of Telcordia standard GR-468-CORE (active devices).

Academic Credentials and Professional Honors

Ph. D., Materials Engineering, University of California, Santa Barbara, 1997
B.S., Materials Science and Engineering, University of California, Berkeley, 1990

ASM International, Undergraduate Paper of the Year, 1990

Licenses and Certifications

Certified Reliability Engineer, #7547

Publications

He MY, Singh D, McNulty JC, Zok FW. Thermal expansion of unidirectional and cross-ply fibrous monoliths. Composites Science and Technology 2002; 62(7–8):967–976.

McNulty JC, He MY, Zok FW. Notch sensitivity of fatigue life in a Sylramic/SiC composite at elevated temperatures. Composites Science and Technology 2001; 61(9):1331–1338.

McNulty JC, Begley MR, Zok FW. In-plane fracture resistance of a crossply fibrous monolith. Journal of the American Ceramic Society 2001; 84(2):367–375.

Singh D, Cruse TA, Hermanson DJ, Goretta KC, Zok FW, McNulty JC. Mechanical response of cross-ply Si3N4/BN fibrous monoliths under uniaxial and biaxial loading. Ceramic Engineering and Science Proceedings 2000; 21(3):597–604.

McNulty JC, Zok FW, Genin GM, Evans AG. Notch-sensitivity of fiber-reinforced ceramic-matrix composites: effects of inelastic straining and volume-dependent strength. Journal of the American Ceramic Society 1999; 82(5):1217–1228.

McNulty JC, Zok FW. Low-cycle fatigue of Nicalon-fiber-reinforced ceramic composites. Composites Science and Technology 1999; 51(10):1597–1607.

McNulty JC, Zok FW. Application of weakest-link fracture statistics to fiber-reinforced ceramic-matrix composites. Journal of the American Ceramic Society 1997; 80(6):1535–1543.

Walls DP, McNulty JC, Zok FW. Multiple matrix cracking in a fiber-reinforced titanium matrix composite under high-cycle fatigue. Metallurgical and Materials Transactions A 1996; 27(7):1899–1908.

Heredia FE, McNulty JC, Zok FW, Evans AG. Oxidation embrittlement probe for ceramic-matrix composites. Journal of the American Ceramic Society 1995; 78(8):2097–2100.

Venkateswara Rao KT, McNulty JC, Ritchie RO. The effects of prolonged thermal exposure on the fracture and fatigue behavior of aluminum-lithium alloy 8090. Metallurgical Transactions A 1993; 24(10):2233–2239.

Book Chapters

Ramamurty U, McNulty JC, Steen M. Fatigue in ceramic matrix composites. In: Comprehensive Composite Materials, Elsevier Science 2000.

Conference Proceedings

McNulty JC. Processing and reliability issues for eutectic AuSn solder joints. Proceedings, 41st International Symposium on Microelectronics (IMAPS 2008), Providence, RI, 2008.

McNulty JC. A perspective on the reliability of MEMS-based components for telecommunications. Proceedings, SPIE, Vol. 6884, 2008.

Schleuning D, Griffin M, James P, McNulty J, Mendoza D, Morales J, Nabors D, Peters M, Zhou H, Reed M. Robust hard-solder packaging of conduction cooled laser diode bars. Proceedings, SPIE, Vol. 6456, 2007.

Rosenberg P, Reichert P, Du J, Fouksman M, Zhou H, McNulty J, Tolman S, Luong C. Highly reliable hard-soldered 1.6 kW QCW laser diode stack packaging platform. Proceedings, SPIE, Vol. 6456, 2007.

Presentations

McNulty JC. Failure analysis of Pb-free electronics. Professional development course, IPC-JEDEC Conference, San Jose, CA, 2009.

McNulty JC. Processing and reliability issues for eutectic AuSn solder joints. IMAPS Conference, Providence, RI, 2008.

McNulty JC, Hillman CD. Current customer concerns regarding the reliability of solid state drives. IDEMA Reliability Symposium, San Jose, CA, 2008.

McNulty JC. A perspective on the reliability of MEMS-based components for telecommunications. SPIE-Photonics West Conference, San Jose, CA, 2008.

Prior Experience

West Coast Office Manager and Senior Member of Technical Staff, DfR Solutions LLC, 2007–2009
Manager of Reliability, Coherent Inc., Semiconductor Business Unit, 2005–2007
Director of Reliability, iolon Inc., 2001–2005
Product Development Engineer, Optical Switch Corporation, 2000–2001
Staff Research Engineer, Materials Department, University of California at Santa Barbara, 1997–2000
Associate Engineer, Baxter Healthcare, Edwards CVS Division, 1991–1992
Research Assistant, Center for Advanced Materials, Lawrence Berkeley National Laboratory, 1989–1990

Professional Affiliations

- SMTA
- IMAPS
- IEEE
- SPIE
- iNEMI