



Exponent[®]

Engineering & Scientific Consulting

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Professional Profile

Dr. Dong's areas of expertise include failure analysis, materials science, mechanical testing, materials characterization and metallurgy. He specializes in performing reliability and failure analysis on solder joints and conformal coating in electronics packaging industry in terms of microstructure-mechanical properties-chemistry relationships. He also has extensive materials characterization expertise for mechanical, microstructure, chemical fingerprints and thermal properties analysis using a variety of techniques such as universal testing machines, hardness testers, optical microscopy (OM), scanning electron microscopy (SEM), energy-dispersive X-ray spectroscopy (EDS), Fourier transform infrared spectroscopy (FTIR), Raman spectroscopy and differential scanning calorimetry (DSC). In addition, Dr. Dong has experience in polymer stability and degradation under irradiation.

Prior to joining Exponent, Dr. Dong was a research assistant in Advanced Materials and Mechanics Laboratory at SUNY Binghamton, where he developed a novel bismuth-nickel (Bi-Ni) transient liquid phase (TLP) bonding as a high-temperature lead-free solder alternative with various bond-line-thicknesses (BLT) through sputtering, preform and paste methods. The microstructure including intermetallic compound development and mechanical reliability of the solder joints were analyzed after accelerated testing (thermal cycling and thermal shock) with SEM-EDS and die shear testing. Additionally, his PhD dissertation focused on polyurethane-based conformal coatings for tin whisker mitigation in terms of curing condition and adhesion properties. Dr. Dong also acquired Lean Six Sigma Green Belt certification in 2018.

Academic Credentials & Professional Honors

Ph.D., Materials Science and Engineering, State University of New York, Binghamton, 2018

M.S., Materials Science and Engineering, Tianjin University, China, 2014

B.S., Materials Science and Engineering, Tianjin University, China, 2011

Languages

Mandarin Chinese

Publications

Dong F, Meschter SJ, Nozaki S, Ohshima T, Makino T, Cho J. Effect of coating adhesion and degradation on tin whisker mitigation of polyurethane-based conformal coatings. *Polymer Degradation and Stability*. 2019,166:219-229.

Dong F, Meschter SJ, Cho J. Improved adhesion of polyurethane-based coatings to tin surface. *Journal of Materials Science: Materials in Electronics*. 2019;30:7268-7279.

Dong F, Maganty S, Meschter SJ, Cho J. Effects of curing conditions on structural evolution and mechanical properties of UV-curable polyurethane acrylate coatings. *Progress in Organic Coatings*. 2018 Jan 31;114:58-67.

Cho J, Dong F, Yin L, Shaddock D. Effects of the Interlayer Thickness and Alloying on the Reliability of Transient Liquid Phase (TLP) Bonding. In 2018 IEEE 68th Electronic Components and Technology Conference (ECTC) 2018 May 29 (pp. 551-556). IEEE.

Dong F, Maganty S, Meschter SJ, Nozaki S, Ohshima T, Makino T, Cho J. Electron beam irradiation effect on the mechanical properties of nanosilica-filled polyurethane films. *Polymer Degradation and Stability*. 2017 Jul 31;141:45-53.

Maganty S, Dong F, Meschter S, Cho J. Microstructure and Property Assessments of UV-Curable Conformal Coatings for Pb-Free Electronics. *Proceedings of the International Conference on Soldering and Reliability, SMTA*. 2016.

Dong F, Wang J, Wang Y, Ren S. Synthesis and humidity controlling properties of halloysite/poly (sodium acrylate-acrylamide) composite. *Journal of Materials Chemistry*. 2012;22(22):11093-100.

Presentations

Dong F. Study of tin whisker growth under polyurethane based conformal coatings. Oral presentation, MS&T, Pittsburgh, PA, 2017

Dong F. Bismuth-Based Transient Liquid Phase (TLP) Bonding as High-Temperature Lead-Free Solder Alternatives. Poster presentation, Electronics Packaging Symposium, GE Global Research, Niskayuna, NY, 2017

Peer Reviewer

Progress in Organic Coatings, Elsevier