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Engineering & Scientific Consulting

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Professional Profile

Dr. Liu specializes in the failure analysis of metallurgical materials and electronic materials, frequently working for many of the world's largest and best-known manufacturers in the consumer electronic and heavy manufacturing industries. His expertise includes hydrogen embrittlement, residual stress measurement of micro-components, fractography of metals and polymers, powder metallurgy, laser welding, lithium-ion battery materials analysis, IPC-600 and IPC-610 review, PCB/FPC corrosion, IC packaging and solder joint integrity issues of ball grid array (BGA).

Dr. Liu graduated from Shanghai JiaoTong University with his Bachelor and Masters degrees in Materials Science and Engineering. In 2011, he received his Ph.D. from Illinois Institute of Technology, focusing on high temperature alloy design and mechanical testing at elevated temperatures. After graduation, he joined the Research and Technology Center of United States Steel Corporation (US Steel) in Pittsburgh. He supported six steelmaking plants in North America and helped US Steel save millions of US dollars from various projects. His working experiences covered various steelmaking processes, such as hot metal treatment, scrap optimization, BOF/EAF steelmaking, argon station, ladle metallurgy furnace, RH degasser, slag analysis, charge model, alloy model, furnace refractory maintenance, slab defect reduction, inclusion characterization, cleanliness improvement and surface defect analysis of galvanized steel sheet.

During his service at Exponent, Dr. Liu assists clients with issues related to electronics product design, quality and reliability. Examples of such projects include failure analysis after fracture of laser welds between dissimilar metals, latent fracture of fasteners, PCB/FPC trace cracking, and open circuit failures on PCBAs. He utilizes a variety of internal and external testing capabilities, including micro-CT scan, XRD, microscopic imaging techniques (SEM/EDS, TEM, EBSD, FIB), chemical analysis techniques (FTIR, MFI, GPC, DSC, TGA, GC-MS), electrical analysis techniques (thermal IR, OBIRCH, TDR, oscilloscope, impedance analyzer), and mechanical testing with customized fixtures. He is a certified trainer of IPC-610 (Acceptability of Electronic Assemblies) and an experienced reviewer of set top box power circuit design.

Academic Credentials & Professional Honors

Ph.D., Materials Science and Engineering, Illinois Institute of Technology (IIT), 2011

M.S., Materials Science and Engineering, Shanghai Jiao Tong University, China, 2004

B.S., Materials Science and Engineering, Shanghai Jiao Tong University, China, 2001

Professional Affiliations

Association for Iron & Steel Technology - AIST

American Welding Society - AWS

Languages

Mandarin

Publications

Q. Liu, P. Nash, The effect of Ru addition on the microstructure and mechanical properties of TiAl alloys, *Intermetallics* 19(2011) 1282-1290

Q. Liu, H. Pielet, P. Kaushik, B. Chukwulebe, An investigation of hot metal desulfurization by Mg, *Iron & Steel Technology*, 6(2009)75-82

H. Wang, Q. Liu, J. Zhang, and T Y Hsu (Xu Zuyao), The size effect on the phase stability of nanograined Fe-12Ni powders and the magnetic separation of fcc-bcc phases, *Nanotechnology*, 14(2003)696-700

Presentations

Q.Liu, Effective Inclusion Treatment With Solid Core Pure Calcium Wire, ASITech, 2013.5, Pittsburgh, PA