Exponent®
Engineering & Scientific Consulting

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Professional Profile

Dr. Kaplowitz's areas of expertise include metallurgy, welding engineering, failure analysis, fatigue and fracture, corrosion, non-destructive examination, and materials characterization. He specializes in assessment of welded components, welding metallurgy, metallic coatings, powder process development, and metals additive manufacturing. Dr. Kaplowitz has proficiency with mechanical testing as well as microstructural analysis via optical microscopy, scanning electron microscopy (SEM), transmission electron microscopy (TEM), and energy dispersive X-ray spectroscopy (EDS). He has experience in a wide range of industries including oil & gas, construction, and consumer electronics.

Prior to joining Exponent, Dr. Kaplowitz was a postdoctoral researcher at the U.S. Army Research Laboratory Center for Cold Spray where he managed cold spray dimensional repair and additive manufacturing testing programs for clients, including the private sector, defense contractors, and divisions of the U.S. Army, Navy, and Air Force. Dr. Kaplowitz planned and performed equipment operation for novel cold/thermal spray research with a wide range of metal, ceramic, and composite powder and substrate combinations. For these investigations, he characterized deposit quality and performance with metallurgical analyses, SEM, optical microscopy, and mechanical testing.

During his graduate study at the University of Maryland, Dr. Kaplowitz researched small-scale nanothermite production using mass flow controlled aerosol systems. His work focused on characterization of synthesized aluminum nanopowder and thermite combinations with SEM, TEM, XPS, TGA, combustion chamber testing, and temperature-jump wire ignition. He invented and patented a scalable process for continuous production of nanoaluminum, improving efficiency and reducing costs compared to current batch-based systems. He subsequently developed thin film coated nanoaluminum products that increased aluminum fuel content and decreased required ignition temperature.

Academic Credentials & Professional Honors

Ph.D., Chemical Engineering, University of Maryland, 2013

B.S., Chemical Engineering, Lehigh University, 2007

Licenses and Certifications

Licensed Professional Engineer, Metallurgical, California, #2004

Certified Welding Inspector (CWI), American Welding Society, #20022871

Prior Experience

Postdoctoral Researcher, U.S. Army Research Laboratory, 2013-2016

Patents

US Patent No 9,492,870: Aerosol Synthesis of Faceted Aluminum Nanocrystals, September 2012 (Jouet RJ, Zachariah MR).

Publications

Champagne VK, Kaplowitz DA, Champagne III VK, Howe C, West MK, McNally B, Rokni M. Dissimilar metal joining and structural repair of ZE41A-T5 cast magnesium by the cold spray (CS) process. Materials and Manufacturing Processes 2016; In Press.

Kaplowitz DA, Jian G, Gaskell K, Ponce A, Shang P, Zachariah MR. Aerosol synthesis and reactivity of thin oxide shell aluminum nanoparticles via fluorocarboxylic acid functional coating. Particle & Particle Systems Characterization 2013; 30:881.

Kaplowitz DA, Jian G, Gaskell K, Jacob R, Zachariah MR. Synthesis and reactive properties of iron oxide coated nanoaluminum. Journal of Energetic Materials 2014; 32:95.

Kaplowitz DA, Jouet RJ, Zachariah MR. Aerosol synthesis and reactive behavior of faceted aluminum nanocrystals. Journal of Crystal Growth 2010; 312:3625.

Presentations

Kaplowitz DA. Cold spray for additive manufacturing and structural repair. Cold Spray Action Team Meeting, Worcester, MA, 2016.

Kaplowitz DA. Cold Spray repair: large structures. Defense Manufacturing Conference, Phoenix, AZ, 2015.

Kaplowitz DA. Cold Spray repair and rebuild technology Phase 2 Office of the Secretary of Defense Manufacturing Technology Program. Joint Defense ManTech Panel, York, PA, 2015.