



Exponent[®]
Engineering & Scientific Consulting

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Professional Profile

Dr. Angle conducts failure analysis, fracture, materials science, and processing/fabrication investigations. His doctoral work focused on the synthesis, fabrication, and testing of composite oxide/ceramic systems used in extreme environment applications ranging from solid-state oxygen sensors to inert nuclear fuels. Additionally, he has experience in ceramics engineering areas such as: oxide thin films, thermal/environmental barrier coatings, solid-oxide fuel cells, transparent ballistic shielding, light-emitting phosphors, combustion catalysis, and 3D printed ceramic architectures. Dr. Angle has expertise in most major materials characterization techniques including X-ray diffraction (XRD), atomic force microscopy (AFM), scanning electron microscopy (SEM), focused ion beam (FIB), transmission electron microscopy (TEM), and mechanical and electrical materials testing.

Prior to joining Exponent, Dr. Angle was a Postdoctoral Research Associate in the Materials Research Laboratory at the University of Illinois at Urbana-Champaign. Working as a member of the British Petroleum - International Centre on Advanced Materials, Dr. Angle led research efforts to fabricate oxide thin-film coatings designed to mitigate the deposition of carbonaceous materials. He developed novel fabrication routes that combined electrodeposition with chemical vapor deposition (CVD) techniques and high-temperature environmental processing to create functional films capable of operating in the harsh petrochemical processing environment. Additionally, Dr. Angle previously held a Visiting Research Fellow position at the University of Tokyo's Institute of Engineering Innovation where he performed in-situ TEM indentation in complex oxide systems.

Academic Credentials & Professional Honors

Ph.D., Materials Science and Engineering, University of California, Irvine, 2014

M.S., Materials Science and Engineering, University of California, Irvine, 2010

B.S., Applied Mathematics, University of California, Irvine, 2009

American Ceramics Society Graduate Excellence in Materials Science Award

National Science Foundation East Asia and Pacific Summer Institutes (NSF EAPSI) Graduate

Students Fellowship

UC Irvine Fletcher Jones Fellowship

UC Irvine Center for Opportunities and Diversity in Engineering Fellowship

National Science and Mathematics to Retain Talent (SMART) Grant

Professional Affiliations

American Ceramics Society

Materials Research Society

American Institute of Chemical Engineers

Publications

Angle JP, Nelson AT, Men D, Mecartney ML. Thermal measurements and computational simulations of three-phase (CeO₂ - MgAl₂O₄ - CeMgAl₁₁O₁₉) and four-phase (3Y-TZP - Al₂O₃ - MgAl₂O₄ - LaPO₄) composites for inert matrix nuclear fuels. *Journal of Nuclear Materials* 2014; 454(1-3): 69-76.

Angle JP, Steppan JJ, Thompson PM, Mecartney ML. Parameters influencing thermal shock resistance and ionic conductivity of 8 mol% Ytria-stabilized zirconia (8YSZ) with dispersed second phases of alumina or mullite. *Journal of the European Ceramic Society* 2014; 34(16):4327-4336.

Angle JP, Morgan PED, Mecartney ML. Water Vapor enhanced diffusion in alumina. *Journal of the American Ceramic Society* 2013; 96(11):3372-3374.

Angle JP, Wang Z, Dames C, Mecartney ML. Comparison of two-phase thermal conductivity models with experiments on dilute ceramic composites. *Journal of the American Ceramic Society* 2013; 96(9):2935-2942.

Moodie ALR, Angle JP, Tackett EC, Rupert TJ, Mecartney ML, Valdevit L. Ceramic and hybrid micro-architected materials for high temperature applications. *Society for the Advancement of Material and Process Engineering (SAMPE)*, 2013.

Podium Presentations

Angle JP, Morgan PED, Mecartney ML. Enhanced diffusion of oxygen in alumina exposed to water vapor. 38th International Conference & Exposition on Advanced Ceramics & Composites, Daytona Beach, FL, January 2014.

Angle JP, Selama ME, Morgan PED, Mecartney ML. Synthesis and characterization of LaCrAl₁₁O₁₉ (Magnetoplumbite). 2013 American Institute of Chemical Engineers Annual Meeting, San Francisco 2013, CA, November 2013.

Angle JP, Morgan PED, Mecartney ML. Novel approaches to make Sr-Doped LaPO₄ (Monazite) for proton conductivity. *Materials Science & Technology Conference & Exhibition*, Pittsburgh, PA, October 2012.

Angle JP, Wang Z, Chan MM, Dames C, Mecartney ML. Thermal shock, microstructure, ionic conductivity, and OOF2 modeling of 8YSZ. 36th International Conference & Exposition on Advanced Ceramics & Composites, Daytona Beach, FL, January 2012.

Angle JP, Ng M, Morgan PED, Mecartney ML. Sr-doped LaPO₄ (Monazite) for proton conductivity. 36th International Conference & Exposition on Advanced Ceramics & Composites, Daytona Beach, FL, January 2012.

Angle JP, Mecartney ML. Thermal shock resistance of yttria-stabilized zirconia with second phases. 35th International Conference & Exposition on Advanced Ceramics & Composites, Daytona Beach, FL January 2011.

Poster Presentations

Angle JP, Morgan PED, Mecartney ML. Proton assisted diffusion in oxides (does steam damage ceramics?). 38th International Conference & Exposition on Advanced Ceramics & Composites, Daytona Beach, FL, January 2014.

Angle JP, Tochigi E, Hoo CM, Ikuhara Y, Mecartney ML. In-situ transmission electron microscopy indentation to characterize deformation in ceramics. Japan Society for the Promotion of Science Summer Program 2013, The Graduate University for Advanced Studies (Sokendai), Japan, June 2013.

Angle JP, Men D., Nelson AT, Mecartney ML. Thermal measurements of 3- and 4- phase ceramic composites using OOF2 analysis. International Congress on Ceramics, Chicago, IL, July 2012.

Angle JP, Mecartney ML. Thermal shock resistance of yttria-stabilized zirconia with second phases. Gordon Research Conference on Solid State Studies in Ceramics, New London, NH, August 2010.

Angle JP, Hoo CM, Mecartney ML. A comparison of conventional and reactive sintering in the formation of three-phase polycrystalline ceramic composites. Undergraduate Research Symposium, Irvine, CA, May 2009.