

**Suresh K. Donthu, Ph.D., P.E.**  
**Managing Engineer**

**Professional Profile**

Dr. Suresh Donthu is a Managing Engineer in Exponent's Polymer Science & Materials Chemistry practice. Dr. Donthu uses his expertise in materials science and engineering to conduct root-cause analysis, risk assessment, and materials selection, testing and evaluation in systems containing variety of materials including metals, plastics, glass, ceramics, and their composites. He has specific experience with failure analysis of plastics including sprinkler and plumbing pipes, metallurgical evaluation of solders and metal pipes, weldability of nickel-based superalloys, evaluation of high performance coatings, materials science based risk-assessment of products containing nanomaterials and asbestos, and materials evaluation of textile fibers. He has conducted research and consulted for clients in the areas of consumer electronics, semiconductor, buildings and construction, and medical devices. Dr. Donthu has extensive hands-on experience with several advanced materials characterization techniques, which he uses to understand structure-property relations in material systems and perform root-cause failure analysis.

Dr. Donthu developed electron beam lithographic fabrication techniques for ceramic and polymeric nanostructures used as nanoscale devices for gas sensing. He has performed research related to the organic-inorganic composite electrocatalyst supports for proton exchange membrane fuel cells and metal silicide thin films and other materials for microelectronics applications. He is familiar with front-end microelectronics processes (device fabrication, clean room processes) and with different microelectronic packages, packaging materials and processes.

Prior to joining Exponent, Dr. Donthu was a research officer at the Institute of Materials Research and Engineering (IMRE) in Singapore, and Center Associate at Northwestern University Atomic and Nanoscale Characterization Experimental Center (NUANCE). He has interned at General Motors Research Center in Michigan and Texas Instruments, Ltd. in Singapore.

**Academic Credentials and Professional Honors**

Ph.D., Materials Science and Engineering, Northwestern University, 2007  
M. Eng, Singapore-Massachusetts Institute of Technology Alliance Program, 2001  
B.S., Materials Engineering, Nanyang Technological University, Singapore, 1999

International Institute for Nanotechnology Recognition of contribution award, (Sponsored by NSF), 2008; Dorothy M. and Earl S. Hoffman Scholarship, American Vacuum Society, 2007; MRS spring meeting graduate student silver award, 2007; First place in science-as-art

competition at MRS spring meeting, 2007; IEEE Sensors Council Presidents Award, 2006; Richter Fellowship, Northwestern University, 2006; International Institute for Nanotechnology outstanding researcher award, 2006; Lee Kuan Yew gold medal, 1999; Institute of Engineers Singapore gold medal, 1999; NatSteel gold medal, 1999; Singapore Airlines national scholarship for entire undergraduate education, 1995

### **Licenses and Registrations**

Registered Professional Metallurgical Engineer, California, #MT1966  
NACE Coatings Inspector Level 1 – Certified (CIP No. 30146)

### **Languages**

Hindi (Native), Telugu (Native)

### **Publications**

Hoffman J, Reitman M, Donthu S, Ledwith P. Complementary failure analysis methods and their application to plastic pipe. ANTEC 2010, Society of Plastics Engineers, Orlando, FL, May 2010.

Tsuji J, Mowat F, Donthu S, Reitman M. Application of toxicity studies in assessing the health risks of nanomaterials in consumer products. In: Nanotoxicity: In Vivo and In Vitro Models of Health Risks. Sahu S (ed), John Wiley and Sons, 2009.

Hoffman J, Reitman M, Donthu S, Ledwith P, Wills D. Microscopic characterization of CPVC failure modes. ANTEC 2009, Society of Plastics Engineers, Chicago, IL, June 2009 (Best paper award).

Donthu S, Cai M, Ruthkosky M, Halalay I. Carbon-titania composite substrates for fuel cell catalyst applications. Chem Commun 2009; 4203.

Donthu S. Nanopatterning of functional oxide ceramics. VDM Verlag, Dr. Muller Aktiengesellschaft & Co. KG, 2009.

Sun T, Donthu SK, Sprung M, D'Aquila K, Jiang Z, Srivastava A, Wang J, Dravid V. Effect of Pd doping on microstructure and gas sensing performance of nanoporous SnO<sub>x</sub> thin films. Acta Materialia 2008; 57:1095.

Donthu S, Alem N, Pan Z, Li S, Shekhawat G, Dravid V, Benkstein K, Semancik S. Directed fabrication of ceramic nanostructures on fragile substrates using soft-electron beam lithography. IEEE Transactions on Nanotechnology 2008; 7:338.

Donthu S. Nanostructure fabrication using inorganic sols and electron beam lithography. Ph.D. Thesis, Northwestern University, Evanston, IL, 2007.

Myers B, Pan Z, Donthu SK, Dravid V. Variable-Pressure Soft-Electron Beam Lithography (VP Soft-eBL). *Microscopy Microanalysis* 2007; 13(Suppl 2):174. Invited Paper.

Mundra MK, Donthu S, Dravid VP, Torkelson JM. Effect of spatial confinement on the glass transition temperature of patterned polymer nanostructures. *Nano Letters* 2007; 7:713.

Donthu S, Sun T, Dravid V. Fabrication of beaded inorganic nanostructures using soft-electron beam lithography (soft-eBL) and their structural characterization. *Adv Mat* 2007; 19:125.

Mundra MK, Donthu SK, Dravid VP, Torkelson JM. Impact on glass transition temperature of confinement in 1-dimensional patterned polymer nanostructure. *Polymer Preprints, ACS Division of Polymeric Materials: Science and Engineering* 2007; 96:928.

Pan Z, Donthu S, Wu N, Li S, Dravid VP. Directed fabrication of radially stacked multifunctional oxide heterostructures using soft-electron beam lithography (soft-eBL). *Small* 2006; 2:274.

Donthu S, Pan Z, Myers B, Shekhawat G, Wu N, Dravid V. Facile scheme for fabricating solid-state nanostructures using E-Beam lithography and solution precursors. *Nano Letters* 2005; 5:1710.

Aslam M, Bhoje R, Alem N, Donthu S, Dravid VP. Controlled large-scale synthesis and magnetic properties of single-crystal cobalt nanorods. *J Appl Phys* 2005; 98:74311.

Donthu S, Pan Z, Shekhawat G, Dravid V, Balakrisnan B, Tripathy S. Near-field scanning optical microscopy of ZnO nanopatterns fabricated by micromolding in capillaries. *J Appl Phys* 2005; 98:024304.

Goh GKL, Donthu S, Pallathadka P. Cracking and orientation of solution deposited rutile TiO<sub>2</sub> Films. *Chem Mater* 2004; 16:2857.

Donthu S, Tripathy S, Chi DZ, Chua SJ. Raman scattering probe of anharmonic effects in NiSi. *J Raman Spectroscopy* 2004; 35:536.

Donthu S, Chi DZ, Tripathy S, Wong ASW, Chua SJ. Micro-Raman spectroscopic investigation of NiSi films formed on BF<sub>2</sub><sup>+</sup>, B<sup>+</sup> and non-implanted (100) Si substrates. *Appl Phys A* 2004; 79(3):637.

Donthu S, Vora MM, Lahiri SK, Thompson CV, Yi S. Activation energy determination for recrystallization in electroplated copper thin films using differential scanning calorimetry. *J Electronic Materials* 2003; 32:531.

Donthu S. Self-annealing in electroplated Cu thin films. M.Eng. Thesis, Singapore-MIT alliance program, 2001.

Donthu S. Effect of preheat on weldability of INCONEL X-750 superalloys. Accelerated Honors Years Project, BS Thesis, Nanyang Technological University, Singapore, 1999.

### **Conference and Seminar Presentations**

Hoffman J, Reitman M, Donthu S, Liu D. Laboratory induced ESC of CPVC fire sprinkler pipe. FAPSIG, ANTEC 2009, Society of Plastics Engineers, Chicago, IL, June 2009.

Donthu S. Tailoring internal microstructure of functional inorganic nanopatterns. Seminar at Institute of Materials Research and Engineering, Singapore, February 2009.

Donthu S, Cai M, Ruthkosky M. Synthesis of nanostructured composite materials for proton exchange membrane fuel cell applications. ACS Conference, Washington DC, 2007.

Donthu S, Pan Z, Dravid V. Tailoring the internal microstructure of functional inorganic nanopatterns. Materials Research Society Spring Meeting, San Francisco, CA, 2007.

Donthu S, Pan Z, Srivastava A, Dravid V. Structural engineering of inorganic nanostructures using Soft-electron Beam Lithography. International Institute for Nanotechnology annual meeting, Chicago, IL, 2007.

Donthu S, Pan Z, Srivastava A, Dravid V. Structural engineering of inorganic nanostructures using Soft-electron Beam Lithography. International Institute for Nanotechnology annual meeting, Evanston, IL 2007.

Donthu S, Pan Z, Aslam M, Srivastava AK, Dravid VP. Site-specific nanopatterning of functional inorganic nanostructures for gas sensing applications. Materials Research Society Spring Meeting, 2006.

Pan Z, Donthu S, Aslam M, Dravid V. Patterning of hierarchical multiferroic oxide nanostructures using soft electron beam lithography (“Soft-eBL”). Materials Research Society Spring Meeting, 2006.

Donthu S, Pan Z, Dravid V. Novel nanopatterning approaches for inorganic materials, International Institute for Nanotechnology annual meeting, Chicago, IL, 2006.

Torkelson J, Mundra M, Donthu S, Dravid V. Modification of glass transition behavior by confinement in 1-dimensional polymer nanopatterns. AIChE annual meeting, November 2006.

Donthu S, Pan Z, Srivastava AK, Chang Y, Dravid VP. Site-specific fabrication of functional inorganic nanostructures. 3<sup>rd</sup> International Conference on Materials for Advanced Technologies, Singapore, 2005.

Goh GKL, Donthu S. Hydrothermal epitaxy of I:V perovskite thin films. Materials Research Society Spring Meeting, San Francisco, CA, 2002.

Donthu SK, Mridha S. In search of viable lead-free solders: Zn-Sn system. National Undergraduate Research Program Symposium, Singapore, March 1997.

### **Patent Filings**

Dravid V, Donthu S, Pan Z. Method of making novel nanopatterns and nanostructures, US Provisional Patent filed, July 2007.

Cai M, Donthu S, Ruthkosky M, Halalay I. Carbon-titania electrocatalyst supports for oxygen reduction in PEM fuel cells. US Patent filed, March 2008.

### **Prior Experience**

Center Associate, NU Atomic and Nanoscale Characterization Experimental Center, 2006–2007

Summer Intern, General Motors Technical Center, 2006

Research Officer, Institute of Materials Research and Engineering, Singapore, 2001–2003

Intern, Texas Instruments Pte Ltd, Singapore, 1997

### **Professional Affiliations**

- Society of Plastics Engineers
- National Association for Corrosion Engineers
- American Ceramics Society
- ASM International
- The Minerals, Metals & Materials Society